Issue Highlights:

- APSS 2011 Recap
- Sleep Research Funding Advocacy Update
- Sleep Research Society on Facebook
- From the Desk at NIH: NIH and the Sleep Research Community
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President’s Message

Dear Colleagues,

Now that the summer is past, activities in the SRS are back in full gear. I would like to begin my first President’s Message by expressing what a great honor it is to be able to serve you as the President of the SRS. I look forward to an active and successful year ahead for the society. First, I would like to take this opportunity to thank James K. Walsh, PhD for the tremendous work he did as SRS President last year. He was able to successfully move several important initiatives forward, including expansion of our government and NIH Liaison activities to promote sleep and circadian rhythms research. I look forward to his continuing service over the next year as the Chair of the Government Relations Committee and a member of the Board of Directors.

I would like to thank all members who attended SLEEP 2011, the premier meeting in our field. Once again the meeting was a great success. This year marked the 25th Anniversary of the SLEEP meetings which are joint meetings of the SRS and the American Academy of Sleep Medicine. Another group that deserves a huge amount of gratitude are SRS Committee Members and the APSS Program Committee who volunteer their time throughout the year in service of the society and take time out at the SLEEP meeting to attend meetings of their respective committees. In June, several members of the five standing committees concluded their terms of service. The SRS thanks the following members, listed by committee, who rotated off of committees for their loyal service:

Educational Programs Committee
Charles Amlaner, D.Phil – Chair
Patrick Fuller, PhD – Vice Chair
Daniel Lewin, PhD
Paul Shaw, PhD

Government Relations Committee
Sonia Ancoli-Israel, PhD
Charles Czeisler, MD, PhD
Eric Nofzinger, MD
Mark Opp, PhD
Susan Redline, MD, MPH

Membership and Communications Committee
Denise Sharon, MD

Research Committee
Hawley Montgomery-Downs, PhD – Vice Chair
Kathryn Lee, PhD, RN

Trainee Education Advisory Committee (TEAC)
Jennifer Martin, PhD – Chair
Mark Mahowald, PhD
Brant Hasler, PhD – Trainee Member-at-Large

After reflecting on a successful meeting and the contributions of our wonderful volunteers, I would like to turn our attention to the tasks ahead for the SRS. Thanks to the hard work of past leaders and SRS volunteers, we have quickly built a dynamic government relations program. It is my goal to continue the SRS efforts in this important area. This will include continuing our systematic approach to educating Congressional Leaders and NIH officials about the value and relevance of sleep and circadian research. During our meetings with NIH Institute Directors, Center Directors, Program Officials and Members of Congress in the coming months we will be highlighting SRS priorities in the new NIH Sleep Research Plan. The new NIH Sleep Research Plan is in the final stages of approval and is expected to be released this Autumn.

Another goal of our efforts in communicating with NIH will be to encourage NIH Directors to continue to appoint strong Program Directors for sleep, and encourage those Program Directors to build RFAs and other programs that continue to serve as a “sparkplug” for the advancement of our field. Over the past two years we have made significant progress in this area. From June 2010 to June 2011 there have been approximately 20 RFAs that are pertinent to investigators in our field. During the first five months of 2011, the number of sleep-specific RFAs has doubled over all of 2010. I intend to continue strongly pursuing this initiative over the next year.

Currently, there are a total of 32 NIH Clinical Translational Science Centers participating in sleep and circadian research. I would like to build upon the work at the CTSCs and help them produce a national network that would facilitate collecting physiological data and genetic material in a standardized way that would foster collaboration across sleep centers.

I would also like the SRS to work with our partner, the AASM in the establishment of a larger number of integrated academic sleep centers and for the SRS to provide consultation to help improve existing centers to speed the translation of our research from the bench to the bedside. One of the first steps in achieving this goal is increasing the number of T32s in sleep. The SRS and AASM have established a joint task force to pursue strategies to double the number of T32s over the next five years. It is felt that increasing the number of NIH funded training programs that are sleep-sleep instead of an add-on to a related field’s training program will help create a critical mass of specialists and investigators at institutions necessary to establish comprehensive academic sleep centers.

Like other associations, academic institutions and individuals, the SRS is not immune from today’s economic realities. I intend to continue to stress financial prudence while keeping the needs of our members as a priority. In order to address a need for additional revenue streams and to provide additional benefits to members, I
have asked the Educational Programs Committee to begin developing new educational products and courses that will further the mission of the SRS and be a valuable resource for investigators in our field.

During the next year I will work with the Membership and Communications committee to build our membership. One strategy we plan to employ is reaching out to academic clinicians, clinical researchers and professionals in related fields who have not yet identified themselves as sleep researchers to bring them into the fold.

We will also continue to foster our young investigators by continuing to host the tremendously popular Trainee Symposia Series. This is a unique opportunity for young scientists to engage in collegial interaction with senior scientists with successful careers across the broad spectrum of sleep and circadian research.

The year ahead will present the SRS with many opportunities and challenges. I look forward to working with all of you to address the challenges and capitalize on the opportunities presented to us. Your input and involvement in the SRS is appreciated and necessary for a healthy organization. Please contact the SRS national office if you wish to volunteer on a committee or have a good idea to improve the society. The national office can be contacted at ncekosh@srsnet.org or (630) 737-9763.

Yours truly,

Phyllis C. Zee, MD, PhD
I thank the APSS organizers for inviting me to present findings on the role of the internal circadian system on disease severity at SLEEP 2011 in Minneapolis, Minnesota. The fact that circadian rhythms feature at the SLEEP conference presumably emerged because the sleep-wake cycle is one of the most noticeable circadian rhythms. We all recognize the powerful drive that results almost inevitably in us falling soundly asleep at night, and conversely how difficult it is for us to sleep for long periods during the daytime or to stay awake for long periods at night. This daily rhythm in sleep-wake propensity is partly an expression of the internal circadian system. Indeed, apart from sleep and wakefulness, almost all aspects of our physiology and our behaviors are organized on a ~24 hour cycle – even in the absence of changes induced by the sleep-wake cycle. Elegant lesion studies have proven the existence of a central circadian pacemaker in the suprachiasmatic nuclei of the hypothalamus (SCN) that orchestrates the many circadian rhythms in physiology and behavior (1). Peripheral cells and tissues themselves possess circadian rhythmicity, usually synchronized with the central pacemaker via indirect neural and humoral influences (2).

Likely the clearest example of the involvement of the circadian system in health is provided by the increased risks of diabetes, obesity, cardiovascular disease and certain cancers that are clearly evident from many epidemiological studies in shift workers (3). The SCN normally adjusts slowly and imperceptibly to the seasonal changes in day length, via the effects of timing stimuli (‘Zeitgebers’) on the central clock e.g., light. However, chronic shift workers tend to experience chronic misalignment between the endogenous circadian timing system and the behavioral cycles. The phase of the central SCN pacemaker may take many days to adapt when these Zeitgebers occur at an inappropriate time, such as following rapid shifts in the light dark schedule with transmeridian jet travel and shift work. In addition, shift workers can experience ‘internal desynchrony’ between the most central SCN circadian phase and the circadian phase of varied organs. Presumably this desynchrony can occur because of differences in speed of resetting the various central and peripheral tissue clocks after a behavioral/Zeitgeber shift, and because some Zeitgebers, such as food intake, could have differential effects on the peripheral clocks compared to the central clock. It is very difficult to study the mechanisms whereby chronic circadian misalignment and/or internal desynchrony can lead to adverse effects on health but this is of vital importance because in today’s society, working irregular schedules has become more and more prevalent with >20 million Americans exposed to shift work.

**Day/night rhythm in disease severity**

Quite apart from the insidious adverse health effects of circadian misalignment and/or internal desynchrony, circadian rhythms may also be involved in the day/night pattern of acute expression of disease. For example, there is a large peak in the incidence of serious adverse cardiovascular incidents in the morning (4), asthma severity is often worse at night, with a higher incidence of deaths from asthma during the night (5), and various types of epileptic seizures occur more often at different times of day, for instance temporal lobe epileptic seizures are most prevalent in the late afternoon (6). These patterns may simply be due to the neurological and physiological responses to the day/night changes in environment and behavior, such as the sleep-wake cycle, the fasting/feeding cycle, or the changes in varied activities across the day. However, since circadian rhythms are responsible for orchestrating much of our physiology appropriately across the day and night, it only seems natural that circadian rhythms would also be intricately involved in pathophysiological mechanisms that underlie changes in the disease severity across the day and night. Work in my laboratory has been geared towards assessing the magnitude, relevance and potential biological basis of such daily changes in disease severity and of circadian/behavioral misalignment, with an eventual aim of development of better therapy e.g. appropriately timed medication. My lecture mostly focused on the cardiovascular system, with brief reference to other diseases in which the circadian system is likely to play an important role (e.g., asthma and epilepsy).

**Day/night rhythm in adverse cardiovascular events**

Cardiovascular disease is the leading cause of death in the US. Myocardial ischemia (insufficient supply of oxygenated blood relative to the demand of the cardiac muscle) can be caused by rupture of an atherosclerotic plaque and subsequent thrombosis affecting the coronary circulation, by hypoxia, or by coronary vasospasm. In extreme cases ‘sudden cardiac death’ can result from an ischemic event in association with severe myocardial infarction and/or ventricular tachycardia/fibrillation. There exists robust epidemiological evidence that the peak incidence of cardiac ischemic events, including angina, acute myocardial infarction, ventricular tachyarrhythmias and sudden cardiac death occurs around 9-11 AM (reviewed in 4). The reasons for this day/night pattern are not yet known, although triggering behaviors occurring at specific times of day have been suggested as a cause. It is equally possible that endogenous circadian rhythms in an array of hemodynamic, hemostatic, endothelial and autonomic variables could cause a day/night pattern in adverse events. An example of one variable that is likely to play a central role in the day/night pattern in adverse cardiovascular events is sympathetic nervous system activation. Sympathetic activation is modulated in most circumstances as a protective homeostatic response to a challenge, such as the ‘fight or flight response’. However, in some individuals with underlying pathophysiology or susceptibility, acute or chronic sympathetic
activation can provoke adverse cardiovascular events, for instance by increasing blood pressure and arterial wall shear forces that could potentially rupture vulnerable atherosclerotic plaques in coronary arteries. Thus, a day/night pattern in the sympathetic nervous system activation might underlie the day/night pattern of adverse events in vulnerable individuals.

The day/night pattern in sympathetic activity could occur simply from a day/night pattern of behaviors, such as a surge of sympathetic activity upon standing up and becoming active in the morning or during REM sleep (7), or it could be modulated by the internal circadian system. It is also plausible that there is an interaction between the behavioral and circadian influences on the sympathetic system. Such an interaction could be expressed as a different sympathetic response to a behavioral challenge occurring at different phases of the body clock. We were keen to identify any periods of exaggerated vulnerability that could help explain the day/night pattern of adverse cardiovascular events in vulnerable individuals and we became specifically interested in this possibility of interaction, and so tested in the laboratory whether or not the sympathetic response to exercise is different at different times of day (or more strictly, at different phases of the internal body clock).

Thus, to quantify both circadian and behavioral effects as well as any interactions, we performed a multi-day ‘forced desynchrony protocol’ in continuous dim light. In this protocol, we scheduled standardized rest and exercise periods evenly across all phases of the circadian cycle while we assessed numerous autonomic, hemodynamic, and hemostatic risk markers across 12 days (8). During baseline resting conditions, we observed large circadian variations in plasma cortisol (peak-to-trough ≈85% of mean, peaking at a circadian phase corresponding to ≈9:00 AM) and in circulating catecholamines (epinephrine, ≈70%; norepinephrine, ≈35%, peaking during the biological day). At the circadian phase equivalent to ≈8:00 PM, there was a circadian peak in blood pressure and a trough in cardiac vagal modulation. Sympathetic variables were consistently lowest and vagal markers highest during the biological night (8). In addition to autonomic effects, we also found highly significant endogenous circadian rhythms in platelet surface markers, such as activated glycoprotein IIb-IIIa, which is involved in the final common pathway of platelet aggregation, with circadian peaks at a phase corresponding to the vulnerable period of 8–9 AM, independent of the sleep-wake cycle, other behavioral influences and the environment (9). Concerning the interaction between behaviors and the circadian system, we found a circadian modulation of the cardiovascular reactivity to exercise, with greatest vagal withdrawal at ≈9:00 AM and peaks in catecholamine reactivity at ≈9:00 AM and ≈9:00 PM (8). Thus, in this group of healthy individuals the circadian system clearly modulates numerous cardiovascular risk markers at rest, including platelet function and circulating cortisol, as well as their reactivity to exercise, including sympathetic activation and vagal withdrawal, with resultant profiles that could potentially contribute to the day/night pattern of adverse cardiovascular events (8). The underlying mechanisms of changes in vulnerability are likely to involve numerous interacting variables (4, 8), but certainly the circadian system would appear to be a potential primary modulator of the timing of adverse cardiovascular events.

As another example of the strong interaction between the behavioral and circadian effects on cardiovascular function, we tested the hypothesis that the circadian system modulates cardiovascular responses to postural stress. It may not seem the case, but merely standing up in the morning after lying down and sleeping all night actually construes a large physiological challenge to the body, as blood tends to ‘pool’ in the lower extremities and the sympathetic system must be rapidly engaged to constrict blood vessels and increase heart rate, cardiac contractility and cardiac output to maintain blood flow and blood pressure to the vital organs including the brain. Too little reactivity could result in fainting (syncope) whereas too much sympathetic activation could lead to the rupture of vulnerable atherosclerotic plaques in coronary arteries leading to adverse events in vulnerable individuals, as mentioned above. Indeed, it is not only heart attacks, sudden cardiac death and stroke that show day/night patterns, but even the incidence of syncope exhibits a daily pattern with more occurrences in the morning. Again, this could be possibly a result of influences from the endogenous circadian system and/or the daily pattern of behavioral stimuli, such as standing up after waking up in the morning. Thus, we performed 60° head-up tilt-table tests at the same time after awakening every 20 hours across 13 days in the laboratory such that tilt table tests were distributed evenly across the circadian cycle (10). We found physiological signs of impending syncope in 21 of 144 tests, with almost all cases occurring in the half of the circadian cycle corresponding to the circadian or ‘biological’ night (equivalent to 10:30 PM to 10:30 AM in these subjects). Thus, the circadian system clearly affects cardiovascular responses to postural stress, resulting in greater susceptibility to syncope during the night. This finding suggests that night-shift workers and people with disrupted sleep at night may have greater risk of syncope as a result of their exposure to postural stress during the biological night.

Blood pressure is an important factor in many adverse cardiovascular events and normally exhibits a large daily variation (11). This daily pattern is usually ascribed to the effects of different behaviors across the day and night since there are clear decreases in blood pressure during nocturnal sleep and clear increases during daytime activities (12). However, we felt it important to document whether the endogenous circadian control system also contributes to the day/night pattern because in the past this has been disputed (13). Thus, in normotensive adults we assessed blood pressure across 3 different multi-day laboratory protocols performed in dim light throughout which behavioral and environmental influences were controlled and/or uniformly distributed across the circadian cycle. Circadian phases were derived from core body temperature. Each protocol enabled assessment of the true endogenous nature of any variations in blood pressure, without influences from changes in behavior, such as the sleep-wake cycle (14). Each protocol revealed significant circadian rhythms in systolic and diastolic blood pressure, with almost identical rhythm profiles among protocols. The peaks of systolic and diastolic blood pressure in all 3 protocols occurred at a circadian phase corresponding to ~9:00 pm i.e., the biological evening (14). Thus, it is clear that there does exist a robust endogenous circadian rhythm in blood pressure. Yet, since elevated blood pressure is usually thought of as a cardiovascular risk factor and since the highest blood pressure occurred at the circadian time corresponding to ~9:00 pm, we are tempted to conclude that the endogenous blood pressure rhythm is not a cause of the morning peak in adverse cardiovascular events.

In summary, epidemiological evidence has raised a vital question concerning the mechanisms underlying the morning peaks in adverse cardiovascular events. Our studies in humans are beginning to assess underlying mechanism in humans, but form only part of
the picture. I would like to stress that all of our studies have been conducted in healthy subjects, and it remains to be seen whether similar endogenous circadian rhythms in cardiovascular variables and similar circadian rhythms in the reactivity of the cardiovascular variables to behavioral challenges occur in more vulnerable groups, such as in people with existing cardiovascular disease, hypertension, obesity, the elderly, and the sedentary. In addition, there are a handful of other laboratories performing related research in humans, and there are many more laboratories emerging with complementary studies in animals that can more precisely assess circadian mechanisms. For instance, such studies in animals have assessed circadian function of peripheral tissues including the heart (15); and used genetic knock out mice targeting core clock elements to assess reactivity to strong challenges across the circadian cycle, such as ischemia (16). Thus, it is an exciting time for researchers in this field. There are many clues to the mechanisms underlying the morning peak in adverse cardiovascular events and once these are better refined, I would anticipate more chronotherapeutic approaches to managing cardiovascular disease.

Day/night rhythm in asthma severity

Asthma is characterized by bronchial hyperreactivity leading to airway inflammation, bronchoconstriction and symptoms of ‘chest tightness’. Clear nocturnal worsening of asthma occurs in as many as 75% of patients with asthma, and the highest rate of asthma exacerbations leading to respiratory failure or death occur across the night (5, 17). However, as with the daily variation in the incidence of adverse cardiovascular events, we still do not know the principal mechanisms underlying nocturnal worsening of asthma. Such changes could be caused by the physiological consequences of sleep (e.g., increased vagal tone, decreased sympathetic activity, decreased temperature), the supine posture (e.g., causing reduced functional residual capacity of the lungs affecting the lower airway caliber), the environment (e.g., allergies to dust mites in the bedding) or factors related to the endogenous circadian system (e.g., increased pulmonary vagal bronchoconstrictive tone during the biological night). Thus, we tested the hypothesis that in humans with asthma, there exists an endogenous circadian rhythm in asthma severity independent of the sleep-wake cycle and other behavioral and environmental factors. Asthma severity was estimated from indices of bronchoconstriction (forced expired volume in 1 second and airway resistance), and perceived symptoms of “chest tightness” and “respiratory discomfort”. These were measured 4 times per day for numerous weeks while in the home setting, and every 2-4 hours throughout two complementary multi-day laboratory protocols: a constant routine protocol and a forced desynchrony protocol. Also, the time of each symptom-based bronchodilator rescue medication use (inhaled β2-adrenergic agonist bronchodilator) was recorded. We found that in the home setting, the times of most severe asthma were immediately before bedtime and upon awakening and that these times coincided with increased chance for asthma inhaler use. In the laboratory studies, we found significant endogenous circadian rhythms—indeed, of the sleep-wake cycle, other behaviors and environmental influences—in indices of bronchoconstriction, with greatest severity during the biological night (~11 PM-7 AM in these subjects) (18). In addition, bronchodilator rescue medication use was much more likely to occur during the biological night than during the biological day. Thus, the circadian phases demonstrating the worst degree of bronchoconstriction coincided with the circadian phases of highest chance for symptom-driven inhaler use. These data suggest that chronotherapy—designed to deliver appropriately timed medication to achieve the most efficacious therapeutic levels at the most needed times (while avoiding higher doses at other times when side effects could outweigh benefits)—may be beneficial in asthma.

Day/night rhythm in epileptic seizures

Epilepsy is another entity that often exhibits a day-night variation in clinical presentation. For instance, Pavlova et al (6), found that the day-night distribution of epileptiform activity depended on the brain area involved, with most temporal lobe seizures occurring between 3-7 PM, with different timing of peak incidence in different brain regions (6). Whether such patterns are caused by the behavioral sleep-wake cycle and/or by a circadian rhythm in vulnerability is unknown. Subsequently, Pavlova et al tested for the existence of endogenous circadian variation of interictal epileptiform discharges, independent of changes in state, environment or behaviors, by performing a forced desynchronization protocol in patients with generalized epilepsy (19). In the patients with sufficient interictal epileptiform discharges to assess variability, most interictal epileptiform discharges occurred during non-rapid eye movement sleep, and there was apparent circadian variation in interictal epileptiform discharges but with different circadian phases of peaks across individuals (19). Thus, while data on chronotherapy for epilepsy is quite limited, there may be clinical utility in investigating this further.

Summary and future directions

I have briefly reviewed how interactions between the circadian and behavioral systems could affect the severity of some diseases such as the day-night pattern of adverse cardiovascular events, asthma exacerbations and seizures. In each case, chronotherapy is probably currently underused considering the very prominent day-night variation in disease severity. This reticence may be due to a need for availability of suitable medications with appropriate pharmacodynamics, and greater understanding of whether clinical vulnerability is produced by specific triggering behaviors, the specific circadian phase, or the combination of a behavioral trigger occurring at a specific circadian phase. This last point is important to consider when circadian rhythms and behaviors become differently aligned, as with sleep deprivation, shift work, jet lag and certain sleep disorders. We learn almost daily of new facets of circadian regulation of physiological processes at a molecular level through to a systems level. These basic science findings appear to have relevance to the many epidemiological findings of day-night patterns of disease severity. However, generally lacking are studies in humans that bridge between the basic science studies and the epidemiological clinical findings. There are more and more workers interested in understanding the underlying mechanisms. Due to limits of time, in this lecture, I was unable to cover the entire field and instead only highlighted a few studies from my own laboratory that are aimed at trying to help bridge this gap in knowledge. Overall, I would conclude that this is an exciting time for circadian biologists interested in the role of the circadian system in disease. It is an important topic and the tantalizing results that have emerged so far are only pieces of a complex puzzle. The future challenge for researchers in this field is to integrate the basic science findings with the findings in laboratory studies in humans, and eventually test...
chronotherapeutic models aimed at improved health and survival. Indeed, there already exist a few isolated examples of success in this area in treating cardiovascular disease, hypertension and cancer (20-21). Whether such chronotherapies ought to be tailored to specific times of the daily rest-activity cycle or to specific phases of the internal circadian pacemaker has yet to be answered, but my suspicion is that it will be important to consider both behavioral cycle and circadian phase for optimal therapy in many cases.

Acknowledgements

I am thankful for the really excellent collaboration with many people over the years. My principal collaborators who contributed to the research on circadian rhythms of disease severity are Michael F Hilton PhD, Kun Hu PhD, Milena Pavlova MD, and Frank AJL Scheer, PhD. We are also grateful to the NIH for funding (grants NIH Grants K24 HL076446; T32 HL07901; R01 HL76409; P30 HL101299; and NCRR-GCRC-M01-RR02635).

Selected references


Steven A. Shea, PhD

Director, Sleep Disorders Research Program, Division of Sleep Medicine, Brigham & Women’s Hospital and Harvard Medical School, Boston, MA, USA
2011 MARY A. CARSKADON OUTSTANDING EDUCATOR AWARD

Established in 2005, the Mary A. Carskadon Outstanding Educator Award is presented to honor excellence in the field of education related to sleep medicine and sleep research.

Recipient

Charles A. Czeisler, PhD, MD, is the Baldino professor of sleep medicine and director of the Division of Sleep Medicine at Harvard Medical School; an affiliate faculty member in the neuroscience program at Harvard Medical School and the Health Science and Technology Program at Harvard Medical School/Massachusetts Institute of Technology; and chief of the Division of Sleep Medicine in the Department of Medicine at Brigham and Women’s Hospital in Boston, Mass. A past president of the Sleep Research Society, he received the 2008 SRS Distinguished Scientist Award.

Dr. Czeisler received a doctorate in neuro- and bio-behavioral sciences and a medical degree from Stanford University, and he earned board certification in sleep medicine from the American Board of Sleep Medicine in 1982. He is a member of the Institutes of Medicine and the International Academy of Astronautics, a deputy editor of the journal SLEEP and has served on advisory committees for organizations such as the Air Force Office of Scientific Research, Institute of Medicine, National Academy of Sciences, National Institutes of Health, and Nuclear Regulatory Commission. For more than a decade, he was team leader of the Human Performance Factors, Sleep and Chronobiology Team of NASA’s National Space Biomedical Research Institute, which is responsible for developing sleep-wake schedule guidelines and related countermeasures for astronauts and mission control personnel. In recent years he has been a consultant to several professional sports teams, helping athletes maximize performance by reducing sleep deficiency and minimizing circadian disruption. He received the 2002 William C. Dement Academic Achievement Award and the 2010 Mark O. Hatfield Public Policy Award from the American Academy of Sleep Medicine.

For more than 30 years, Dr. Czeisler has been the course director of the Harvard University undergraduate course “Circadian Biology: From Cellular Oscillators to Sleep Regulation,” and as PI of the BWH ‘Training in Sleep, Circadian and Respiratory Neurobiology’ Grant, he has been instrumental in the training of more than 100 trainees since the grant’s inception.

Dr. Czeisler’s research interests include the circadian and homeostatic processes that regulate sleep and neurobiological function during wakefulness, the physiological mechanism underlying photic resetting of the human circadian pacemaker and the influence of chronic sleep restriction on human performance. He has been a leading advocate for the development of sleep-related public policy that promotes safety and occupational health. As SRS president from 2005 to 2006, he heightened public awareness of the dangers involved with drowsy driving by chairing a Presidential Task Force on Sleep and Public Policy that recommended model drowsy driving legislation. His research on the association between sleep deprivation and performance errors has been influential in shaping medical policy related to the training of resident physicians and graduate medical education, and he continues to study how the timing of work shifts, bright light exposure and sleep episodes can be improved to benefit shift workers.


2011 DISTINGUISHED SCIENTIST AWARD

The Distinguished Scientist Award is the highest award presented by the Sleep Research Society. Established in 1989, the award recognizes significant, original and sustained scientific contributions of a basic, clinical or theoretical nature to the sleep and circadian research field. This award honors a single individual for research contributions made over an entire career.

Recipient

Fred W. Turek, PhD, is the director of the Center for Sleep and Circadian Biology and the Charles E. and Emma H. Morrison professor of biology in the Department of Neurobiology and Physiology at Northwestern University in Evanston, Ill.

Dr. Turek received a doctorate in biological sciences from Stanford University in 1973 and completed a two-year postdoctoral fellowship in the Department of Zoology at the University of Texas. In 1975 he started as an assistant professor of biology at Northwestern, where he currently serves as a professor in the Department of Neurobiology and Physiology in the Weinberg College of Arts and Sciences, and in the Department of Neurology and the Department of Psychiatry and Human Behavior in the Feinberg School of Medicine. He also is a member of the medical school’s Center for Reproductive Sciences, Lurie Cancer Center, Buhler Center on Aging, Center for Genetic Medicine, and Northwestern Comprehensive Center on Obesity.

He is chair of the SRS Government Relations Committee and a member of both the SRS NIH Liaison Group and the SRS Congressional Liaison Group. He is a deputy editor of the journal SLEEP, was editor in chief of the Journal of Biological Rhythms from 1995 to 2000, and was the founding president of the Society for Research on Biological Rhythms from 1987 to 1992. Dr. Turek has served on the Boards of the NIH National Center on Sleep Disorders Research and the National Sleep Foundation. He is the Section Editor for “Genetics..."
of Sleep” and “Chronobiology” for the 2010 edition of Principles and Practices of Sleep Medicine.

Dr. Turek’s present research interests include the genetic, molecular and neural basis for sleep and circadian rhythms with a special interest on the role of the sleep and circadian clock systems for energy balance, obesity, premature birth, GI function and depression. His laboratory is working with a number of different animal models for aging, as well as for the effects of stress, sleep loss and circadian disruption on mental and physical health, and he is engaged in translational research on human fatigue and sleep with the maritime industry. He has published more than 340 reviews and peer-reviewed papers.


2011 Outstanding Scientific Achievement Award

Established in 2006, the Outstanding Scientific Achievement Award is presented to individuals based on novel and seminal discoveries of a basic, clinical or theoretical nature that have made a significant impact on the sleep field.

Recipient

Terry B. Young, PhD, is professor of epidemiology in the Department of Population Health Sciences of the School of Medicine and Public Health at the University of Wisconsin-Madison. Dr. Young completed her undergraduate training in biochemistry at The State University of New York in Syracuse, and her graduate training in physiology at Rutgers University in New Jersey, and in medical sociology and epidemiology at the University of Wisconsin-Madison. She is an associate editor of the journal SLEEP and received the 2008 William C. Dement Academic Achievement Award from the American Academy of Sleep Medicine.

Dr. Young’s research focus is on the natural history of sleep apnea and other sleep disorders such as narcolepsy and chronic insomnia. Of particular interest is the role of sleep apnea in cardiovascular and behavioral morbidity, the development of sleep disorders with aging, genetic markers for sleep disorders, and sleep disorders over the menopausal transition. She also collaborates with molecular geneticists who identified the first human sleep gene (Clock), which may influence circadian patterns.

Dr. Young is the principal investigator of the Wisconsin Sleep Cohort, an ongoing, longitudinal epidemiology study involving overnight polysomnography studies on a random, baseline sample of 1,550 men and women in the general population, assessed at four-year intervals. The primary goal of the WSC is to investigate the natural history of sleep-disordered breathing (SDB) and other sleep disorders, with the long-term goal of better understanding the total societal burden of SDB. Specifically, the aims of the study are to describe the occurrence - including age and sex-specific prevalence - for mild, moderate and severe SDB; estimate, with longitudinal data, the role of SDB in cardiovascular and behavioral morbidity and mortality; and identify risk factors for the development and progression of SDB.

The WSC has produced seminal findings on the wide prevalence of sleep apnea through approximately 100 publications, including the landmark study, “The occurrence of sleep-disordered breathing among middle-aged adults.” Published in The New England Journal of Medicine in 1993, it is one of the journal’s top 10, most-cited papers in the last two decades. The next phase of the WSC will target the natural history of sleep disorders in older-aged persons; the relation between sleep disorders and cognitive decline; and continued exploration of cardiovascular and cerebrovascular outcomes of sleep disorders.

Among Dr. Young’s most recent sleep-related publications are, “Common variants in P2RY11 are associated with narcolepsy,” published in Nature Genetics in 2011; and, “The effects of sleep-disordered breathing on arterial stiffness are modulated by age,” published in SLEEP in 2010.

Young Investigator Award Recipients

Siobhan Banks, PhD

Dr Siobhan Banks is currently a Research Fellow in the Centre for Sleep Research at the University of South Australia. Dr Banks received her PhD from Flinders University in 2004 and undertook a post doctoral fellowship with Professor David Dinges at the University Of Pennsylvania before joining the faculty in the School of Medicine as a Research Assistant Professor in 2006. Dr Banks’ recent research has focused on the impact of chronic sleep restriction and recovery sleep opportunities on neurobehavioral and physiological functioning in both patient populations and healthy individuals. This research has been supported by the NIH and NASA.

In 2009 she returned to Australia with a Fellowship for Women in Science from the University of South Australia, to continue to investigate the impact of sleep loss on health. Dr Banks has authored over 100 journal articles, book chapters, and abstracts and she is on the editorial board of the specialty journal SLEEP.

Matt Carter, PhD

Dr. Matt Carter is interested in the neural basis of innate, homeostatic behaviors. He received his undergraduate degree in Biology (with Honors) from Whitman College and his PhD in Neuroscience from Stanford University. In the lab of Dr. Luis de Lecea at Stanford, Dr. Carter used optogenetic tools and viral gene delivery strategies to investigate the role of hypocretin/orixin and locus coeruleus neurons in wakefulness and arousal. He is currently conducting postdoctoral research in the lab of Dr. Richard Palmeter at the University of Washington, using genetic tools and probes to study the neural circuitry of arousal and other innate behaviors.

In addition to research, Dr. Carter is also passionate about science education. He won Stanford University’s Walter J. Gores Award for Excellence in Teaching, as well as the Stanford School of Medicine’s Excellence in Teaching Award two years in a row. He is the co-author of the textbook “Guide to Research Techniques in Neuroscience,” and his next book about science communication will be published by Elsevier/Academic Press in 2012.
What does winning this award mean to you?

I am extremely elated and grateful that the Wisconsin Sleep Cohort Study’s (WSCS) scientific contributions were the basis for receiving the Sleep Research Society’s Outstanding Scientific Award for 2011. As the award is based on novel and seminal discoveries of a basic, clinical or theoretical nature, it is particularly significant to me that the SRS Board of Directors considered the WSCS, a population based study, to intersect the traditional areas of basic, clinical and theoretical work and thus qualify for the award.

It was just this interface of science that NIH envisioned in funding WSCS in 1989 for the Specialized Center of Research in Cardiopulmonary Disorders of Sleep. Of most personal significance, the award seemed to be a culmination of the growing support of the sleep field over the past few decades to value and incorporate epidemiologic design and population data. Most importantly, epidemiology became seen as a method to not only describe prevalence and trends, but to test etiological hypotheses and translate findings to public health.

What achievements in your career stand out to you?

After training in epidemiology and conducting research on several topics of cancer etiology, I abruptly changed direction, never looked back, and embarked into sleep research in a very short period of time. I consider the success of this move a great personal achievement that totally defined my career—and life. It was a major achievement, with the help of many others, particularly Jerry Dempsey, Steve Weber, Safwan Badr, and James Skatrud (all co-investigators of the NIH-SCOR in Sleep), to implement the design of the longitudinal WSCS.

At the beginning, the plan to conduct over 1000 in-laboratory polysomnography studies on a random sample of the general population, to be repeated longitudinally every 4 years, was termed the “great wall of sleep” by Dr. Weber (But I doubt if we could see the cohort from the moon…). The first major publication, Young et al, NEJM 1993, that documented the high prevalence and wide severity of unrecognized sleep apnea was a high point. Of particular importance was the unexpected finding that sleep apnea was common in women, as well as men. It was gratifying to have sleep researchers in other countries wave the
NEJM article at me and say this paper was important in being able to go to their ministries of health to convince them of the importance of sleep in health.

I consider collaborations to merge epidemiology with basic and clinic science important achievements. Many collaborations stand out, in particular, with Emmanuel Mignot and his fellows on genetic aspects of sleep, heart failure with Douglas Bradley and his fellows, and Mary Morrell and Barbara Morgan on physiology and breath-by breath level data from the WSCS. We look forward to more to come soon, with Donald Bliwise (movement disorders) and Daniel Buysse (insomnia).

I was also very honored to receive the William C Dement Academic Achievement Award from AASM in 2008. Additionally, being part of the ever-growing journal SLEEP as an associate editor and now as a deputy has been a special ongoing achievement.

Finally, our data strongly linking sleep apnea with hypertension and overall mortality have stood up over time and I feel were among our most important accomplishments in understanding a significant role of untreated sleep apnea in cardiovascular pathogenesis.

Who were some of the researchers you admired in your early career?

William C Dement is the most amazing and most brilliant person I have known, and that has not changed. His zeal in promoting sleep research was contagious, and his ability to move heaven and earth for the greater good of sleep was never questioned. I always felt very honored to be able to provide him with data from the WSCS to fuel his intense drive for sleep to be rightfully recognized as a major health factor.

Thorarinn Gislason, Marku Partinen, Sonia Ancoli-Israel, Wolfgang Schmit-Nowara, Susan Redline, and John Stradling were among the few people conducting population-based studies at the time, and I read their publications over and over. I received invaluable guidance from Mary Carskadon, Joyce Walsleben, Tom Roth, Alan Pack, and Kingman Strohl. There are too many others to name...this is a wonderful group of people to work with.

What scientific questions have interested you more recently and what projects will you focus on in the future?

We continue to focus on the role of sleep disorders in cardiovascular pathology. Our collaboration with Drs Stein and Korcaz at the UW Cardiovascular Imaging Center is very exciting in exploring mechanisms of how sleep apnea adversely affects the cardiovascular system.

With our aging cohort (now 55-85 years of age), we will be looking at sleep (sleep apnea, insomnia, sleep duration and habits) and aging in general, and also will be accruing morbidity endpoints to complete our specific aims. Paul Peppard, UW Asst Professor and long time sleep researcher, heads a new grant on the WSCS investigating changes in sleep with retirement.

What guidance can you give to more junior sleep and circadian scientists? What are the keys to a successful research career?

Solid hypotheses and collaborations that bring unique talent together are the keys to success. Over and over, governmental agencies have stressed that their interest is in funding research into disorders that are likely to have a significant public burden and key role in serious morbidity.

What is the hardest part of your job?

While the internet and other communications technology has brought the research community closer, personal contact remains critical. Keeping in touch with collaborators and collaborating on projects across borders, whether virtual or real, can be challenging.

What/when was the aha moment when you knew you were successfully contributing to society?

Our first round of analyses estimating the unexpectedly high prevalence of sleep apnea was shocking, particularly finding high prevalence for women as well as men. After publication of the manuscript, Occurrence of Sleep-disordered Breathing in Adult Men and Women, the reaction from the sleep research community was an enormous moment of feeling we were on an important track.
Actigraphy as a Tool for Measuring Sleep: Pros, Cons and Secrets of the Trade

At the 2011 SLEEP meeting, Drs. Buxton & Knutson co-chaired a discussion group on the use of wrist actigraphy. This discussion group was motivated by the fact that despite its use for nearly 30 years, actigraphy in practice can still be more art than science. With the burgeoning use of actigraphy in clinical trials and large epidemiology studies that aim to add an “objective” assessment of sleep duration or fragmentation, an open discussion about the appropriate use of actigraphy was timely. Given the serious lack of critical validations justifying assumptions at every stage of actigraphy use, including the hardware, collection, analysis (software), and interpretation, there is a serious need to clarify the use of actigraphy as a field, with an eye towards empirical and stringent validation of actigraphic assessments of sleep. Furthermore, which actigraphic variables are valid research or clinical measures were discussed.

In addition to the co-chairs, Orfeu M. Buxton, PhD from Harvard Medical School and Kristen L. Knutson, PhD from University of Chicago, there were three discussants: Martica Hall, PhD, University of Pittsburgh; Monique K. LeBourgeois, PhD, University of Colorado at Boulder; Maria Montserrat Sanchez Ortuño, University of Murcia School of Medicine. There were three learning objectives for the discussion group:

1. Participants will be able to understand the assumptions, stated or unstated, in publications describing actigraphy collection analysis and interpretation.
2. Participants will be able to identify the strengths and limitations in the use of actigraphy to assess sleep.
3. Participants will be able to articulate the key research questions surrounding the longitudinal validity of actigraphic assessments of sleep.

We first presented an overview of the strengths and limitations of actigraphy. Wrist actigraphy can be used to obtain rest-activity pattern data from which one may then estimate sleep duration and quality. Strengths of this methodology include that it is relatively unobtrusive and non-invasive and is simple to use by participant/patient. In addition, wrist actigraphy is often cheaper than PSG and can provide data when PSG is impractical. One of the most important strengths is that obtaining measurements over multiple days is much more feasible than PSG. Despite these strengths, actigraphy has many limitations that need to be addressed and discussed, which was the motivation for this discussion group.

Among actigraphy’s limitations is the fact that wrist actigraphy data is one-dimensional. These data are based on movements (activity) with the underlying assumption that high levels of activity indicate wake. As such, actigraphy only reports sleep and wake and sleep stages cannot be ascertained. Also since it’s based on movement, sedentary behaviors can look like sleep, which can be particularly problematic for estimating sleep in individuals who have low levels of daytime activity (e.g. obese) or who lie quietly awake at night (e.g. insomniacs). Although some devices include light measurements, sleeves and bedcovers may provide estimate light levels that differ from levels experienced by open or closed eyes of the participants. Multi-modal devices including more information about the sleep environment, including light, temperature, sound and/or other data modalities are needed. Another important limitation is that devices can usually be removed by participants, and this removal cannot always be identified by the device. Validation studies are infrequent, often dated, and significant opportunities for improvement remain. Just because “there’s an app for that” doesn’t necessarily mean the estimates of sleep and wake are valid.

Proposed minimum requirements for actigraphy include, but are not limited to, the need for rigorous validation studies, researcher access to the raw data; user-friendly information for device use, testing, and maintenance; detailed trouble-shooting documentation for device failures from hardware to user to analysis; error support and transparency.

Dr. Buxton discussed the usefulness of actigraphy citing examples from recent findings. In Work, Family, and Health Network studies involving a nursing home worker cohort, his group has shown that managers’ behaviors and attitudes in the workplace (openness and flexibility regarding employee work-family issues) are significantly related to employees’ measured sleep duration and cardiometabolic risk. Specifically, they observed a significant dose response relationship of that exposure to sleep duration, whereby less creative open and flexible managers have employees who sleep on average 30 minutes less per night than employees supervised by more open, creative and flexible managers, controlling for a host of relevant factors (Berkman et al., 2010). In the same dataset, we observed that black (African/Caribbean migrant) workers slept about an hour less than white (primarily American) workers, a black/white difference that has been observed in other studies. In multivariable regression modeling, nearly 40% of this variance was explained by socioeconomic and occupational factors (especially nightwork shifts). Their results also suggest that working women with a nonstandard work schedule are likely to get an insufficient amount of sleep (Ertel et al., 2011). Such studies highlight the potential usefulness of actigraphy to understand the causes and consequences of sleep deficiency due to work, family, neighborhood or many other levels, and offer the opportunities to explore modifiable health disparities involving sleep.

Dr. Knutson raised the issue that we need a good estimate of bed time (“lights off”) and wake time (“lights on”) in order to conduct the analysis. There are a few sources from which to obtain these estimates. Many people ask participants to complete a sleep log/diary in conjunction with wearing the actigraphy monitor. This can provide reasonable estimates in compliant, diligent subjects/patients. However, there are many instances where the times in the diary do not correspond well to the actigraphy data. An additional means to determine bed time and wake time is to use the device’s “event marker”, a button the wearer can press to mark the data. Discussion indicated highly variable success with using this button,
which may vary by subject population. Furthermore, a subject can forget to push the button, in which case alternative methods are required. The third method is to simply use the data itself to select a bed time and wake time that encompasses all of the apparent nocturnal inactivity (i.e. “sleep”). This method has its limitations as well, particularly if the wearer participates in sedentary activities prior to their actual bedtime (e.g. watching television or reading). Some devices include a measure of light and it was suggested that the light data be used to identify “lights off” and “lights on”, which would be reasonable for subjects/patients who have dark curtains and don’t share a bedroom with someone else who could turn on the light. It was suggested that at least two people review problematic actigraphy records to come to consensus on bed times and wake times. Many audience members expressed similar difficulties with identifying bed times and wake times. What was the final solution to this problem? It remains to be determined.

Dr. Hall presented data concerning how many days of recording are enough to estimate the various sleep characteristics calculated from wrist actigraphy. She analyzed actigraphy data collected in adult men and women who had at least 14 days of recordings available. She then estimated the number of days necessary to provide a stable estimate of sleep duration, sleep latency, wake after sleep onset, sleep efficiency and sleep fragmentation. Results indicated that, not surprisingly, more than one day is required, but with the exception of sleep latency, 7 days of recording could suffice.

Dr. Montserrat Sanchez Ortuño discussed the use of actigraphy in insomnia. Historically, when using actigraphy in insomnia treatment studies, the trend is to use mean values of sleep quantity measures, such as SOL, WASO, TST and SE. Typically these actigraphy-derived measures show fewer effects than diary-derived measures. This is one of the chronic frustrations in insomnia treatment studies: that actigraphy-derived measures cannot detect treatment benefits shown by sleep diaries, and even PSG. She suggested an alternate approach for using actigraphy in insomnia research, one that exploits its main strength: the fact that it can be used for multiple nights. Rather than using mean values, it may be more useful to take advantage of the multiple nights of recording and documenting night-to-night sleep changes. Dr. Sánchez Ortuño proposed the use of an index of variability called the mean square successive differences (MSSD) (Von Neumann et al., 1941, Sanchez-Ortuño et al., 2011). As its name implies, this index takes into account changes from one night to the next. She presented preliminary data suggesting that the amplitude of night-to-night changes of actigraphy-derived sleep measures, as measured by the MSSD, was significantly related to perceived sleep quality in chronic insomnia sufferers. That is, greater sleep instability was related to poorer sleep quality.

Dr. LeBourgeois discussed methods to enhance compliance in children. Researchers and clinicians working with children have the additional challenge of working with younger, perhaps less compliant subjects/patients. Dr. LeBourgeois has had a lot of experience working with children and shared what she has learned from this experience. If you give a parent and child an actigraphy monitor with minimal explanation and instruction, compliance will be low. However, she suggested that a combination of detailed training on the use of the device, follow-up with telephone calls and emails to the parents, frequent visits and questions of the parents can greatly enhance compliance and subsequently the quality of the data collected. This is valuable advice for those who wish to collect good quality actigraphy data in young children, but is also applicable to studies of all age groups.

In summary, many researchers and clinicians are using or interested in using wrist actigraphy to estimate sleep, both in clinical practice and in research. It was suggested that a consensus report be developed to address these issues and limitations in order to try to unify methodologies and minimum reporting standards. We believe a related effort is ongoing in the American Academy of Sleep Medicine. In addition, more detail in the “methods” section of articles describing how these issues were addressed could be included, but some were concerned about being the first person to be peer-reviewed with these details included! Unfortunately, it is precisely this lack of transparency and unified methodology that led to the need for this Discussion Group. It is important to recognize both the strengths and the limitations of wrist actigraphy, as with any method or device. The field would benefit from increased methodological and technical transparency, coupled with further validation studies addressing all assumptions, stated or unstated, about the use of actigraphy.

References


Kristen L. Knutson, PhD
Section of Pulmonary & Critical Care Medicine
Department of Medicine
University of Chicago

Orfeu M. Buxton, PhD
Division of Sleep Medicine
Harvard Medical School
Brigham and Women’s Hospital
The 16th Annual Trainee Symposia Series, which kicked off SLEEP 2011, had one of the highest rates of attendance (284!) since its founding. Overall, it was highly praised and provided trainees with the opportunity to network and gain valuable knowledge in novel areas of basic and clinical sleep and circadian rhythms research. The trainees represented a variety of undergraduate, graduate, and clinical programs, including neuroscience, nursing, and even criminal justice. An increase in the number of merit and first-time travel awards offered and funded by the Sleep Research Society and a switch to a two-day schedule in order to adapt to the recently revised APSS scientific program contributed to this fantastic turnout. Unlike in previous years, the keynote lecture and subsequent workshops began early Saturday afternoon (versus morning) so that more trainees traveling during the early morning could still attend. A datablitz was also added to the program as part of the evening’s social reception and career fair. The datablitz featured six speakers with the top ranked abstracts submitted for the society’s merit and undergraduate awards. On Sunday morning, the sessions continued, and included a workshop focused on writing F&K mechanism grants that was led by past grant awardees and several program officers from the National Institutes of Health.

The Saturday afternoon keynote lecture began with a wonderful welcoming from the immediate past President of the Sleep Research Society, Dr. James Walsh, who encouraged trainees to remain active in the field. He reinforced the importance placed by the SRS on its trainees and their professional development. The immediate past Trainee Member-At-Large, Dr. Brant Hasler, then provided a welcoming introduction to the keynote speaker, Dr. Daniel Buysse, and acknowledged the hard work of the committees integral in organizing the Trainee Symposia Series. Dr. Buysse provided an extraordinary perspective and advice about pursuing and producing groundbreaking clinical and experimental sleep research, using some of his own compelling data as examples. Many trainees were extremely grateful and appreciative of Dr. Buysse’s humbling words and take-home messages. Afterwards, trainees attended Saturday’s two scheduled workshops, and were thoroughly impressed with this year’s fascinating and multidisciplinary topics and the charismatic speakers who led these workshops. Topics included the anthropology of sleep, the role of yoga and mindfulness in sleep continuity, and the pros and cons of various scoring technologies. The datablitz session at the end of Saturday’s session was well-attended, and many trainees expressed enthusiasm about adding this event to the annual program. At last, the workshops continued on Sunday morning and ended early Sunday afternoon in order to provide trainees with the opportunity to attend the APSS program sessions. One workshop that was highly lauded was the F&K mechanism grant workshop which enabled trainees to receive feedback on their own specific aims from NIH program officers and previous F&K mechanism awardees.

In summary, the unique schedule and numerous award presentations at this year’s Trainee Symposia Series were met with great enthusiasm, as many trainees praised the Trainee Symposia Series for allowing them to take advantage of the invaluable scientific and professional development opportunities. At this time, it is important to thank the many individuals and committees of the Sleep Research Society who are instrumental in the organization, financial support, and execution of yet another successful Trainee Symposia Series. Members of the Trainee and Education Advocacy Committee (TEAC) spend months prior to the meeting communicating ideas to maximize the scientific and professional development experience and approve the speaker and topic selections offered by the Trainee Day Subcommittee.

Members of the TEAC committee included: Jennifer Martin, PhD; Phillip Gehrmann, PhD; Lisa Meltzer, PhD; Brant Hasler, PhD; Allison Brager, PhD; Janet Mullington, PhD; David Raizen, MD, PhD, FAASM; Monique LeBourgeois, PhD; Jeanne Duffy, PhD; Rachel Manber, PhD; Jonathan Wisor, PhD.

Members of the Trainee Subcommittee included: Daniel Kay; Lori McGee; Jean Humphries; Tina Burke; S. Justin Thomas; Jennifer Goldschmied; Jared Saletin; Katharine Newman-Smith; Felicia Jefferson; Christine Gagnon; Kay Orzech; Sinziana Seicean.

It is always important to note that the majority of the content of the trainee symposium series comes from this committee of trainees. The Board of Directors of the Sleep Research Society is responsible for further feedback on the program and most importantly, for approving the record-number of travel and merit awards presented to trainees. Finally, a warm thank you to the many speakers and administrative planners of the Trainee Symposia Series whose impeccable insight have enabled the hundreds of trainees in attendance to advance their scientific and professional careers and encourage trainees to remain active in the society.

Speakers: Wendy Troxel, PhD; Kenneth Lichstein, PhD; Fred Turek, PhD; Ruth Benca, PhD; Hawley Montgomery-Downs, PhD; Derk-Jan Dijk, PhD; Peter Franzen, PhD; Ronald Szymusik, PhD, FAASM; Kristen Knutson, PhD; Donald Bliwise, PhD, FAASM, Robert Strecker, PhD; Magda Ali, PhD; Andrew Krystal, PhD; Nalaka Gooneratne, MD, FAASM; Dale Edgar, PhD; Susan Redline, MD; Paul Shaw, PhD; Christopher Landrigan, MD; Chiara Cirelli, MD, PhD; Jeanne Duffy, PhD; Kathryn Lee, PhD, RN; Jason Ong, PhD; Robert Stickgold, PhD; Clete Kushida, MD, PhD, RPSGT, FAASM; Michael Chee, MBBS; Michael Perls, PhD; Allan Pack, PhD; MBChB; Rakesh Bhattacharjee, MD; Mark Aloia, PhD; Rachel Manber, PhD; Jonathan Wisor, PhD; Monique LeBourgeois, PhD; Rebecca Bernert, PhD; Michele Okun, PhD; Daniel Lewin, PhD; Michael Twery, PhD; Aaron Laposky, PhD.

Administrative Staff: Nicholas Cekosh, Annie Walker-Bright, National Office Sleep Research Society.

Allison Brager, PhD
Trainee Member-At-Large
SRS Leadership

**President**

Phyllis C. Zee, MD, PhD

Phyllis C. Zee is Professor of Neurology, Neurobiology & Physiology, and Director of the Sleep Disorders Center and the sleep medicine fellowship training program, at Northwestern University’s Feinberg School of Medicine in Chicago, Illinois, where she is also Associate Director of the Center for Sleep and Circadian Biology.

Dr. Zee directs an interdisciplinary clinical and research program in sleep and circadian rhythms. Research topics in this Program range from basic animal studies to therapeutic clinical trials. Her research has focused on the effects of age on sleep and circadian rhythms, genetic regulation of circadian sleep disorders, and behavioral interventions to improve sleep and performance. In addition, current NIH sponsored research includes studies that examine the relationship between sleep and sleep disorders with metabolic and cardiovascular risk in populations at risk, such as older adults, and the effects of sleep disturbance on adverse pregnancy outcomes.

Dr. Zee also has authored more than 100 peer reviewed original articles and over 40 chapters and reviews on the topics of sleep, circadian rhythms, and sleep/wake disorders.

A fellow of the American Academy of Sleep Medicine, fellow of the American Academy of Neurology and member of the American Neurological Association, Dr. Zee has served on numerous national and international committees, NIH scientific review panels, and advisory boards. She is past Chair of the NIH Sleep Disorders Research Advisory Board, and a Deputy Editor for the journal SLEEP.

Dr. Zee was honored with a Sleep Academic Award from the National Institutes of Health to enhance education in sleep medicine and is the recipient of the 2011 American Academy of Neurology Sleep Science Award.

**Secretary-Treasurer**

Janet Mullington, PhD

Janet Mullington, PhD is Associate Professor of Neurology at Harvard Medical School and has been the Associate Program Director for the Beth Israel Deaconess Site of the Harvard Clinical and Translational Science Center, since 2008. In addition, she is the Research Fellow for the Oliver Wendell Holmes Society of Harvard Medical School, a role dedicated to serving the research training mission of the school, and she has served on the medical school’s Diversity and Multicultural Committee since 2008. Dr. Mullington received her PhD from the University of Ottawa in Canada, did postdoctoral work in Germany at the Max-Planck institute and at the University of Pennsylvania in Philadelphia. Her primary research interest is in the area of inflammation and sleep loss. She is an editorial board member of SLEEP and of Nature and Science of Sleep. Dr. Mullington began service in the Sleep Research Society as a reviewer in 1997, volunteered as a member of the Educational Programs Committee from 2002-2005, and stemming from that experience, was instrumental in putting together Career Development courses by the SRS and held at the APSS. Dr. Mullington was elected to the board of directors in 2008 and served as board liaison for the Trainee Education Advisory Committee (TEAC) from 2008-2011.

**Directors at Large**

Jennifer L. Martin, PhD

Jennifer L. Martin, PhD first joined the SRS in 1994 as a student member. She has a long history of service to the organization, and currently serves as the Chair of the SRS’s Trainee Education Advisory Committee (appointed in 2007) after serving as a member of that committee for two years (2005-07). Dr. Martin is a Research Health Scientist and Psychologist at the VA Greater Los Angeles Healthcare System (VAGLAHS) in the Geriatric Research, Education and Clinical Center (GRECC). She is also an Adjunct Assistant Professor in the David Geffen School of Medicine at the University of California, Los Angeles. Dr. Martin has a strong research program, funded both by the NIH and VA, in the area of sleep and aging. Her research foci include the impact of sleep disturbance on sleep regulation, interactions between sleep and thermoregulation and the circadian control of sleep. He is the current Secretary-Treasurer of the SRS (2008-2011) and previously served the SRS as Program Chair for Trainees (2000-2002). He has also served as Scientific Program Committee Chair for the SLEEP Meeting (2003-2004).
the health of older people, and the development and implementation of effective behavioral treatments for sleep disorders across the adult age range. In addition to research, Dr. Martin is a faculty member of the VA's psychology internship program, and of the VA's sleep medicine fellowship program. She teaches in the areas of sleep in geriatric patients, evaluation and treatment of insomnia, and circadian rhythm sleep disorders. She serves as a member of the Continuing Education Committee for psychologist at the VAGLAHS and runs an insomnia treatment program within the GLAVAHS Sleep Disorders Center.

Elizabeth B. Klerman, MD, PhD
Elizabeth B. Klerman, MD, PhD is an Associate Professor in Medicine at the Brigham and Women's Hospital and Harvard Medical School and Director of the Analytic and Modeling Unit within the Division of Sleep Medicine. She performs basic and translational human research and develops new analytical methods for circadian, sleep, hormone and performance/alertness data. Her research portfolio also includes the application of circadian and sleep research principles to pathophysiologic states and mathematical modeling of human circadian, sleep, and neurobehavioral mood and performance rhythms. She is dedicated to developing the next generation of sleep and circadian researchers. Her current post doctoral and doctoral trainees have been recognized for their scholarship, winning several mathematical modeling prizes and research grants. She hosts between 3 and 5 undergraduate students every year. Beth was recently awarded a NIH K24 award which will enable her to continue mentoring the next generation of researchers. She is Associate Team Leader for the National Space Biomedical Institute Human Factors and Performance Team. She has been a member of the SRS since 1986, was a member of the Web Services Committee 2001-2004 and Chair and Web Site Editor of the Communications Committee 2004-2007. She is currently a member of the Research Committee (2010-present). She has reviewed for the journal SLEEP since 1998 and is a member of the Editorial Board for SLEEP (2006-present).

Fred W. Turek, PhD
Dr. Fred W. Turek received his BS in biological sciences from Michigan State University in 1969, and his PhD in biology from Stanford University in 1973. After two years of postdoctoral training at the University of Texas at Austin, he took a faculty position at Northwestern University, where he subsequently served as Chair of the Department of Neurobiology & Physiology from 1987-98. He is the founder (1996) and current Director of the Center for Sleep and Circadian Biology at NU where he has held an endowed chair since 1995. He was the founding president of the Society for Research on Biological Rhythms (1986) and was Editor-in-Chief of the Journal of Biological Rhythms from 1995-2000. Since 2002 he has been Deputy Editor of the journal, SLEEP. He is presently the Chair of the Governmental Relations Committee of the SRS. His research on biological rhythms and sleep has been supported by the NIH, NSF, NASA, the Air Force, the Army, DARPA, American Waterways Operators, as well as a number of pharmaceutical companies and private foundations.

Dr. Turek has received a number of awards, including an NIH Research Career Development Award, two NIH Senior International Fogarty Fellowships, a Guggenheim Memorial Foundation Fellowship, the Curt P. Richter Prize from the International Society of Psychoneuroendocrinology and a Distinguished Investigator Award from National Alliance for Research on Schizophrenia and Depression. He has served on the Board of Directors of the NIH National Center on Sleep Disorders Research and the National Sleep Foundation. His present research interests include the genetic, molecular and neural basis for sleep and circadian rhythms in rodent models and humans, with a special interest in circadian dysregulation for a number of mental and physical diseases. He has published over 340 reviews and peer-reviewed papers.

Allison Brager, PhD
Allison Brager, PhD is a postdoctoral fellow at Morehouse School of Medicine working under Ketema Paul, PhD. Dr. Brager has been an active member of SRS since 2006. At present, she is the Trainee Member-At-Large and a non-voting member of the SRS Board of Directors. Prior to this elected position, Dr. Brager has served on the Trainee and Education Advisory subcommittee since 2008, which is instrumental in organizing the annual William C. Dement Trainee Symposia Series. Dr. Brager’s research focuses on circadian regulation of homeostatic systems, including reward, sleep, and metabolism. She also maintains a blog (www.dormivigilia.com) acknowledged by the Society for Neuroscience which highlights recent progress in sleep, circadian rhythms, and neuroscience research.
Sleep Research Funding Advocacy Update

The intense partisan debate among legislators and the administration regarding the debt ceiling, deficit, and spending priorities has left many Americans scratching their heads about the ability of Washington to address the nation’s economic and fiscal challenges. Both parties fell short in July by reaching just a temporary deal to raise the debt ceiling and avoid default on our financial obligations. The temporary agreement allows for incremental increases in the debt ceiling contingent upon congressional action expected this fall.

The temporary budget deal also provides an allocation of overall discretionary funding levels for the upcoming fiscal year. This will allow legislators to work to complete the fiscal year (FY) 2012 appropriations bills when they return to Washington in September. Ironically, the debt ceiling agreement provides some relief for several of the appropriations bills that received initial draconian allocations, including the Labor-HHS measure which provides annual funding for the National Institutes of Health (NIH) and the Centers for Disease Prevention and Control (CDC)—the two federal agencies most engaged in sleep research.

In addition to working on the FY12 appropriations bills, lawmakers will attempt to address the serious long-term issues of revenue, entitlement, and spending reform in the fall. The debt-ceiling agreement establishes a 12-member bipartisan, bicameral congressional committee (super committee) charged with identifying $1.5 trillion in additional deficit reduction by November 23rd, 2011. Congress must hold an up-or-down vote on the committee’s recommendations by December 23rd.

The Sleep Research Society (SRS) is now in the process of developing a grassroots plan to match-up SRS members with the super committee members to educate them about the importance of federal support for sleep research. Although the focus of the debt ceiling discussion has primarily centered on deficit reduction it has been gratifying to hear the president mention the importance of maintaining our national commitment to medical research throughout this debate.

SRS Immediate Past President James Walsh has made several trips to Washington during the last few months to meet with legislators—particularly members of the House and Senate Appropriations Committees—to advise them of the importance of federal support for sleep disorders research through NIH, and the continuation of public health activities specifically focused on sleep through CDC. When these committees consider their funding measures for fiscal year 2012, we are hopeful they will include positive recommendations featuring sleep research and other sleep programs.

Dale P. Dirks and Meaghan Pilarcik
Health and Medicine Council of Washington
The SRS “Likes” Facebook

At this past SLEEP meeting, the Sleep Research Society has launched its own Facebook page, located at http://www.facebook.com/sleepresearchsociety. The page had been in development since the 2010 SLEEP meeting, when the Membership and Communications Committee explored the idea with the Executive Board. The Board was very supportive, and tasked the Committee with the relatively simple task of developing the page, as well as the relatively difficult task of working out the logistic and programmatic issues that might mitigate the success of the SRS’s first venture into social media. Since that time, members of the Committee have worked with the Board and AASM Social Media Specialist Patrick Murray to develop and implement a successful social media presence.

What is a Facebook page?

For the uninitiated, Facebook is a website where individuals host a page about themselves, post “status updates” that let others in on their thoughts, upload picture albums that others can browse, link to other website pages they find interesting, and perhaps most importantly, establish a network of “friends” by linking their page to the pages of others. By doing this, when someone you are “friends” with posts something like a link or a picture, it shows up on your Facebook page, and you can even leave a comment for them to see. Facebook currently boasts 750 million users, so chances are, you know all of this already. Recently, Facebook has allowed organizations to establish a “Page” that is like an individual’s page – the organization posts links, photos, updates, and more. The page also links to other relevant organizations and contains information about that organization. To make updates from that organization appear on your page, all you have to do is press a button that says you “Like” that organization. So if you go to the SRS page and click “Like,” those posts will end up on your Facebook Page.

What gets posted, and how often will posts show up on my page?

Many of the posts will be related to the SRS itself, including announcements, awards, etc. In addition, there will be posts highlighting recent papers relevant to sleep research, usually written by SRS members and/or featured in SLEEP, the official publication of the SRS. You can also expect to find photos from recent SLEEP meetings. As the page grows, this list will expand to include more content.

How is the Facebook page useful to SRS members and the public?

The Facebook page will be an easy source of basic useful information about the SRS, including website links, contact information, etc. It also explains to the public what the SRS is. If you “Like” the SRS, updates will show up on your page as they are posted, so you can keep up to date with what the SRS is doing without having to visit the page or website. Posts will also keep you up to date with announcements of interesting papers as they are published. You cannot post your own link to the Facebook page, but if there is something you would like to post, feel free to contact Patrick Murray or one of the other Administrators (which fluctuate but are listed on the page).

An exciting feature of Facebook is the ability to “Like” individual comments and postings, as well as comment on them. So if you see a post about a controversial article, you can leave a comment about that finding. Hopefully, that will inspire others to comment as well and we can have some valuable scientific discussions about these papers. Don’t be afraid of voicing an opinion – the SRS is committed to openness of discussions and will rarely disallow a comment (as long as it conforms to the rules listed below). As the SRS Facebook community grows, hopefully so will the discussions.

Another important feature of the Facebook page is the opportunity for networking. Anyone who “Likes” the SRS and becomes linked to the SRS page will be able to see who else has “Liked” the SRS. In this way, you will be able to see other sleep researchers on Facebook and potentially link your page to theirs and become “friends.” This opens the door to many networking possibilities. If you are worried that anyone who “Likes” the SRS can see your private information, you can set your Facebook privacy settings so that only your “friends” have access to your posts and photos, and others (including other SRS members) can only see your name and profile picture. That way, your information is kept private.

What is not allowed, and who is monitoring the content?

Links and comments will not be allowed if they are in any way advertisements or endorsements for commercial products or entities. Also, negative remarks that are derogatory or that otherwise do not contribute to the conversation in a scientifically acceptable manner may be removed. Finally, the Administrators and SRS Board reserve the right to remove comments or potentially even ban users if needed. This is done with the intention of keeping this public forum as open, collegial, and welcoming as possible. As mentioned earlier, Patrick Murray, the Social Media Specialist is primarily responsible for updating and managing content. In addition, there will always be a member of the Membership and Communications Committee listed as an Administrator as well.

Where do I start?

Just visit http://www.facebook.com/sleepresearchsociety to get started. If you don’t have a Facebook account, you can get one by going to http://www.facebook.com.

Michael A. Grandner PhD
Membership and Communications Committee
Sleep Research is Supported NIH-wide

The National Institutes of Health (NIH) is the world’s largest sponsor of investigator-initiated biomedical research issuing more than $20 billion in awards to over 45,000 unique research projects each year. These awards and the funding levels associated with specific scientific domains primarily reflect the culmination of competition involving prioritization by external peer reviewers. The budget associated with a particular scientific area generally follows the merit ranking of submitted applications rather than a priori budget planning.

The potential for sleep and circadian research to advance fundamental, applied, and clinical sciences is evident in the distribution of grants supported by many NIH Institutes and Centers (ICs) NIH-wide (Figure 1). Although the absolute number of projects varies year-to-year, sleep and circadian research is supported NIH-wide suggesting a diverse array of opportunities. Investigators can use the National Institute of Neurological Disorders and Stroke-sponsored NIH Maps website (http://nihmaps.org) to graphically explore the thematic relationship of sleep and circadian research to the science supported across the NIH (Figure 2). The visualization tool reveals the spread of “sleep” grants (circles) across various NIH thematic areas (dot clusters color-coded by IC funding). Selecting adjacent dots produces an analysis of the thematic relationship and links to publicly available grant data.

Sleep Research Training and Dissemination

The NIH supports an array of funding mechanisms that facilitate research training at various stages of career development and across the full breadth of NIH science including sleep and circadian research (http://grants.nih.gov/training/kwizard/). Success rates for trainee applications proposing sleep and circadian research under the mentored clinical research career awards (K23 and K08) are comparable to the NIH averages (Figure 3). The number of sleep clinician scientists in training appears to be slowly declining (Figure 4), which means that the future momentum of clinical sleep research may depend, in part, on innovative strategies that will inform clinicians of the opportunities for sleep research. The National Heart, Lung, and Blood Institute (NHLBI) and the Eunice Kennedy Shriver National Institute of Child Health and Human Development co-sponsored the Education Research in Sleep Health and Sleep-Circadian Biology (R25) program (http://grants.nih.gov/grants/guide/pa-files/PAR-11-098.html) which supports the development of portable educational programs that aim to stimulate the transfer of sleep knowledge to various audiences including physicians in training.

Research Grant Applications

To improve the likelihood of a successful application, investigators should allow ample time to understand the NIH’s priorities, discuss general plans and funding mechanisms with program staff in appropriate ICs, and write the grant application. The success of nearly all applicants, trainee and established investigators also pivots on the selection of a scientific question and a focused, cogent presentation. The research problem and approach should be clear and compelling to reviewers even if they are not experts on the topic. Generally, proposals that significantly probe our understanding of “how things work” are not going to succeed. The development of NIH Maps, and with it the thematic display of a small proportion of NIH-supported sleep research, illustrates an approach that can inform the design of successful applications and also enhance an investigator’s understanding and appreciation of the potential impact of clinical sleep research.

From the Desk at NIH:
NIH and the Sleep Research Community

![Figure 1. Number of active NIH grants in fiscal years 2008, 2009, and 2010 that were identified by the Research, Condition, and Disease Categorization (RCDC) system as “sleep research.” The explanation of NIH Institute and Center (IC) acronyms and information regarding IC mission is available online (http://www.nih.gov/icd/index.html). Source: http://report.nih.gov/rcdc/categories/](http://grants.nih.gov/grants/guide/pa-files/PAR-11-098.html)
Figure 3. The number of K23 and K08 applications and “new” awards reported NIH-wide compared to the number reported for sleep research (RCDC) in fiscal year 2010. Vertical axis is logarithmic to facilitate the comparison of bars. The K08 bars (n=1) are not visible.

Sources:
† Obtained from NIH RePORT(Research Portfolio Online Reporting Tools) on Training and Research Career Development Programs: http://report.nih.gov/success_rates/index.aspx
‡ Calculated from available NIH Office of Extramural Research electronic Research Administration (eRA) module data
* Calculated from available NIH Office of Extramural Research electronic Research Administration (eRA) module based on NIH Research, Condition, and Disease Categories (RCDC) data

Figure 4. The number of active K23 and K08 grants identified by RCDC as “sleep research.” Overall, trend observed across fiscal years 2008, 2009, and 2010 appears to be downward.

Source: Data obtained from NIH RePORTER (RePORT Expenditures and Results) module based on NIH Research, Condition, and Disease Categories (RCDC) data for Sleep Research
http://projectreporter.nih.gov/reporter.cfm
work” (e.g. mechanisms) will generate more enthusiasm from reviewers than just describing “what happens”. The most suitable research questions are fresh and compelling, well-supported by evidence, scientifically well-focused, clearly stated, and likely to significantly advance scientific understanding. Not all research activities qualify as specific aims or research plan goals. For instance, the collection of data and the application of various technologies may be time consuming and important steps, but do not necessarily qualify as a specific aim. Individual aims are compelling as scientific questions and the contribution to the central objective of the study must be clear.

The combined expertise of scientists serving on an NIH study section is intended to span the breadth and diversity of the science it covers. The NIH Center for Scientific Review (www.csr.nih.gov) provides information on the scientific scope of each study section and the roster of reviewers. Applicants may request a particular venue for review in the application cover letter. This request should be made carefully since there is no right to appeal administrative decisions such as the assignment of an application to a review panel. Consulting with colleagues and program officials for advice on study section assignment, and examining the list of awarded grants reviewed by a particular study section (http://projectreporter.nih.gov/) can help identify potential options. The challenge of crafting a compelling proposal for an audience of diverse individual expertise and scientific perspective may be facilitated by obtaining feedback on your draft research plan from colleagues with a track record of successful NIH applications and varying familiarity with the research topic.

Nation-wide U.S. Centers for Disease Control and Prevention health surveillance surveys estimate that 10-30 percent of adults report obtaining insufficient rest or sleep daily posing an immense burden to public safety, and diminishing the ability of individuals to attain their optimal potential with respect to health and productivity. Investigator-initiated sleep and circadian research will have a leading role in producing the evidence base needed to facilitate and ultimately improve public health.

Resources mentioned

http://www.cdc.gov/sleep/data_statistics.htm
(Map of Sleep Insufficiency)
http://www.cdc.gov/Features/dsSleep/

Michael Twery, PhD
Director, National Center on Sleep Disorders Research
National Heart, Lung, and Blood Institute, NIH
Towards Comprehensive Academic Sleep Centers

The 2006 Institute of Medicine report “Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem” proposed that sleep medicine is inherently an interdisciplinary field that involves many different medical disciplines, professional groups, and investigators from diverse backgrounds. Given this, the report recommended that all academic medical centers should develop interdisciplinary sleep centers. Some (Type 1) would be focused on clinical service and clinical training while others (Type 2) would also include research. The ideal model would be a comprehensive interdisciplinary center (Type 3). Type 3 centers would have clinical service, clinical and research training, basic and clinical research and be involved in public education about sleep and its disorders. These comprehensive centers could form a national network for conduct of clinical trials and translational research (e.g., large scale genetic and proteomic studies).

At the time of the report, the IOM committee indicated that there were only two such centers—Harvard University and the University of Pennsylvania. The latter was the first to be established having been founded in 1991. Since then a number of other institutions have developed such centers. These include Northwestern University, Stanford University and the University of Pittsburgh. Moreover, institutions in other countries have developed these structures. One example is the robust program at the University of Sydney (Australia), directed by Dr. Ron Grunstein. The Australian group has also been successful in obtaining funds to develop a national clinical trials network. In addition, the Canadian MRC has also invested in this concept and four sleep/circadian centers have been funded. In the United States a Sleep Research Network has been established based on an initiative by the University of Pittsburgh. It does not, however, have major financial support which limits what it can achieve. It is of interest that although this concept developed in the United States, major investments to form sleep centers where the leader of the center reports to the dean for program development.

Joint Task Force on Academic Sleep Centers

At the Minneapolis meeting the group came to the conclusion that we needed to focus on a measurable outcome. We selected institutional T32 grants. These are grants provided to institutions for research training. To be successful there needs to be a critical mass of faculty that work together. For several of our current comprehensive academic sleep centers, including the University of Pennsylvania Sleep Center, obtaining an institutional T32 was the initial step in developing the faculty cohesion to facilitate development of a center. Currently in sleep medicine there are only six institutions with institutional T32 grants. They are: Case Western Reserve University, Harvard University, Morehouse University, Northwestern University, University of Pennsylvania and University of Pittsburgh. To put this in perspective, there are over 40 institutions with institutional T32 grants in pulmonary disease. At the present time, all sleep T32 grants are funded by the National Heart, Lung and Blood Institute. There is no reason why this needs to be the case since any NIH Institute with an interest in sleep research could fund a T32 grant. Indeed, previously the National Institute on Aging funded for many years a T32 grant to Stanford University. Since the funding available for T32 grants is fixed and will not grow, obtaining a T32 for sleep research requires replacement of a currently existing T32 from another field. However, currently 100% of all submitted T32 grants in sleep have been funded, although it may have taken more than one submission.

Given this situation, the working group has established an ambitious measurable goal - doubling the number of T32 grants for sleep research in the next five years. We believe that if this is successful, it will lead to an increase in the number of comprehensive sleep centers where the leader of the center reports to the dean of the medical school and receives resources from the dean for program development.

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There are substantial advantages to forming a comprehensive academic sleep center. It is a vehicle to promote collaboration between investigators from different disciplines working together. It facilitates translational research and interaction between investigators in basic science and clinical research. It also catalyzes the development of cores to support work of a number of different investigators (e.g., a clinical research center for sleep research, a mouse sleep behavioral core). A single center per institution has more control of resources and can help ensure that funds generated by the sleep program are reinvested in the center. Such centers working together can tackle large clinical projects (i.e. clinical trials, comparative effectiveness research and genetics). This model is known to be successful and is based on the very successful comprehensive cancer center model. One difference is that the cancer center model is strongly supported by NIH and there are substantial national and local resources that are invested in this effort.

The Sleep Research Society (SRS) and the American Academy of Sleep Medicine (AASM) are very supportive of this concept and wish to see more comprehensive sleep centers developed in our major academic centers. A number of steps to address this issue have been taken. First, a SRS task force, chaired by Dr. Ruth Benca (University of Wisconsin), did a national survey to evaluate the current situation. Second, a small working group that chaired by Dr. Pack gave a number of recommendations to the Board of the SRS. The AASM, under the leadership of Dr. Strollo (University of Pittsburgh), has addressed the same issue. Hence the SRS and the AASM have proposed a joint effort between the two societies. As a result, a joint task force has now been formed. The members of the task force are: Drs. Allan Pack and Patrick Strollo (co-chairs), Ron Chervin, Andrew Chesson, Janet Mullington, Steve Shea, Jim Walsh and Phyllis Zee. The group had an initial meeting at the APSS meeting in June in Minneapolis and is organizing regular conference calls.

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Given this situation, the working group has established an ambitious measurable goal - doubling the number of T32 grants for sleep research in the next five years. We believe that if this is successful, it will lead to an increase in the number of comprehensive sleep centers where the leader of the center reports to the dean of the medical school and receives resources from the dean for program development.
To make this goal a reality, the working group came to the following conclusions on a recent call:

1. Identify institutions that are poised and interested in applying for institutional T32 grants. The working group plans to approach individuals in these programs to see what the AASM and SRS could do to facilitate their application. We plan to share with these institutions copies of successful T32 applications.

2. Proposing a workshop to develop a strategic plan for this initiative. We would seek funding from the Boards of the AASM and SRS. The workshop would be held in Washington with NIH program staff being invited as well as the leadership of the Sleep Disorders Research Advisory Board. To be successful, we will need the Advisory Board to identify enhancing research training as a major priority.

3. Continuing discussions with NIH about novel multi-institutional research training efforts. Many of our institutions do not have a critical mass of investigators to develop a T32. How do we take steps to provide research training in these institutions and allow them to seed their research programs? These institutions may be interested in providing matching funds for this effort. In general, we believe that NIH needs to take new approaches that think “out of the box” to stimulate research training in new fields and in new directions in established fields.

4. Another strategy to address this issue is to add slots for sleep research training to existing T32s in relevant areas (epidemiology, genetics, neuroscience, etc.). This will require a proactive strategy to identify and capitalize on these opportunities.

While the joint task force will initially focus on T32 training, we appreciate that research training is a continuum of effort. Future efforts could address the issue of K awards. There are, unfortunately, very few of these in sleep research.

In conclusion, it is gratifying that both the AASM and SRS have identified increasing the scope of research training in sleep as a high priority. We have established a clear metric to assess success and our members need to hold us accountable as to whether we did or did not achieve this goal. Even in these difficult economic times, we can achieve a lot but only if we all work together for a common purpose. The direction for this new working group is an appropriate one and hopefully will obtain the support of all members of both societies.

Allan I. Pack, MBChB, PhD
John Miclot Professor of Medicine
Director, Center for Sleep and Circadian Neurobiology
Chief, Division of Sleep Medicine
Perelman School of Medicine at the University of Pennsylvania
Philadelphia, Pennsylvania

Patrick J. Strollo, Jr., MD, FCCP, FAASM
Medical Director, UPMC Sleep Medicine Center
Professor of Medicine and Clinical and Translational Science
Division of Pulmonary, Allergy, and Critical Care Medicine
Pittsburgh, Pennsylvania
The Role of Astrocytic Transmitter Release in the Cognitive Effects of Sleep Deprivation


In recent years, much neuroscience research has aimed to understand the role of sleep in cognitive function (Stickgold, 2005). But today this is still an open question, and the cellular and molecular mechanisms underlying sleep function are not well understood. However, several studies have suggested a critical role of sleep in memory consolidation, hypothesizing that sleep may be important to reactivate memory traces and facilitate memory storage. It is also clear that sleep deprivation impairs memory consolidation, but it is not clear what molecular mechanisms underlie the impact of sleep and sleep deprivation on memory storage.

Our research focuses on the molecular mechanisms of memory storage, and we have recently become interested in identifying the molecular mechanisms by which alterations in sleep impair memory (Vecsey et al., 2009). With prolonged wakefulness, levels of adenosine increase in the brain, and this adenosine is thought to drive subsequent sleep (Forkkka-Heiskanen et al., 1997). Research from the laboratory of Dr. Phil Haydon (Tufts University) suggests that this adenosine may derive from transmitters released from astrocytes in the brain. Using a molecular genetic approach to disrupt SNARE-dependent exocytosis specifically in astrocytes (called dnSNARE mice), Dr. Haydon found that blocking gliotransmission prevented the extracellular accumulation of adenosine, which is formed from ATP released by astrocytes (Pascual et al., 2005). What are the behavioral effects of this alteration in extracellular adenosine? Is the astrocyte-derived adenosine a candidate mechanism responsible for cognitive deficits following sleep disturbances? In a previous study of memory using the novel object recognition task - a task based on the spontaneous detection of the novelty - these dnSNARE mice were protected against the memory-degrading effects of sleep loss. The same protection against sleep deprivation was observed when wild-type mice were treated with the adenosine A1 receptor (A1R) antagonist 8-cyclopentyl-1,3-dimethylxanthine (CPT) (Halassa et al., 2009). These findings suggested that astrocyte-derived adenosine might be a candidate molecule responsible for cognitive deficits following sleep disturbances.

In a recent paper published in *The Journal of Neuroscience* (Florian et al., 2011), we and our collaborators examined whether block-ade of gliotransmission or blockade of A1R signaling could prevent the negative effects of 6 hours of sleep deprivation on hippocampal long-term potentiation (LTP), a form of synaptic plasticity that is a cellular model of memory storage. We found that sleep deprivation impaired LTP in wild-type mice, and that this deficit was rescued by the treatment of wild-type mice with chronic infusion of CPT. Interestingly, dnSNARE mice are similarly protected from deficits in LTP resulting from sleep loss. We then asked whether astrocyte transmitter release is involved in the behavioral deficits in memory that result from sleep deprivation. Different classes of memory rely on different brain regions (e.g. novel object recognition depends on extra-hippocampal regions, whereas spatial memory is highly dependent on the hippocampus proper). Therefore, we investigated whether memory in a spatial object recognition task - a task based...
on the detection of changes in the spatial arrangement of objects in an arena - was also impaired by sleep deprivation. Our behavioral studies indicated that sleep deprivation performed immediately after a spatial memory task disrupted memory in wild-type mice but not in dnSNARE mice. Similarly, we showed that the sleep deprivation-induced memory deficit was rescued in wild-type mice treated with A1R antagonist. These data suggest that glia-released ATP is responsible for at least some of the effects of sleep loss on hippocampal function.

Building on this study, future research will aim to identify the molecular mechanisms downstream of A1R activation through which sleep deprivation impairs synaptic plasticity and memory formation. It will be of interest to identify targets whose expression levels are disrupted by sleep deprivation, and to determine which of those targets are rescued in dnSNARE mice or in mice treated with CPT. This should pinpoint those targets responsible for preserving cognitive function in the absence of glia-mediated adenosine signaling.

Pharmacological approaches have been developed to treat many of the symptoms of psychiatric diseases, but deficits in cognitive function remain resistant to these treatments. These cognitive deficits are debilitating, and they contribute to the inability of patients to hold down a job and participate fully in society. In addition to cognitive deficits, psychiatric disorders such as schizophrenia and depression are also accompanied by disturbances in sleep (Benson and Zarcone, 2000). In general, sleep disturbances are a major problem in modern society. Hopefully our work identifying a new role of glial release of ATP in the genesis of memory deficits following sleep deprivation will contribute to the discovery of therapeutic targets to reverse cognitive dysfunction induced by sleep disturbances.

References:


Cédrick Florian, PhD
Institut Cochin
INSERM U.1016 / CNRS UMR 8104
Université de Paris Descartes
24 rue Faubourg Saint Jacques
75014 Paris
FRANCE

Chris Vecsey, PhD
Department of Biology
Brandeis University
415 South St., MS008
Waltham, MA, 02454

Ted Abel, PhD
Department of Biology
University of Pennsylvania
Philadelphia, PA 19104
News and Announcements

SRSF Announces 2012 Grant Opportunities

The Sleep Research Society Foundation is pleased to announce two funding opportunities for 2011.

**J. Christian Gillin, MD, Research Grant**

The Sleep Research Society Foundation J. Christian Gillin, MD, Research Grant supports beginning investigators in sleep research with the purpose of collecting pilot data to be used for future grant applications. The grant includes one-year of support in the amount of up to $20,000 for one year.

**Elliot D. Weitzman, MD Research Grant**

The SRS Elliot D. Weitzman, M.D. Research Grant is intended to facilitate established researchers in developing novel and innovative lines of research that differ from their previous areas of research by assisting them in developing pilot data that will support applications for NIH or other federal grants. The criteria for the Weitzman grant makes it similar to a NIH R21 grant. The Weitzman Grant is funded up to a maximum of $20,000 over one year.

The submission deadline for applications is November 30, 2011.

Three Additional Conversations with Our Founders

Videos Now Available

Three new videos in the SRS Conversations with our Founders Project are now available on the SRS Website. The new interviews are with Peter Hauri, PhD, Wallace Mendelson, MD and a new joint interview with William Dement, MD, PhD & Allan Rechtschaffen, PhD.

You may access the interviews via the following link: http://www.sleepresearchsociety.org/ConversationsWithFounders.aspx

SLEEP 2011 Scientific Posters Available Online

View and discuss nearly 250 of the top scientific abstracts presented as posters at the SLEEP 2011 25th Anniversary Meeting of the Associated Professional Sleep Societies, LLC (APSS) through the SLEEP 2011 Online Poster Viewing Website. Each poster on this site is available in PDF format, and a comments area allows for interactive discussion of the science presented at the meeting. Access to the online posters is FREE for SRS members who attended SLEEP 2011. All other individuals may purchase access view the posters for $25, providing unlimited access to the site until November 30, 2011. Log in or register at www.sleepmeeting.org to create an account and gain access to this excellent educational resource.

Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring

The White House has announced the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring. Currently inviting nominations for both institutional and individual awards, the program recognizes high quality mentoring in all fields of science, including biomedicine. Awardees are selected based on their track record of enhancing participation and retention of individuals who might not otherwise have considered careers in science, technology, engineering, and mathematics. The awards are administered by National Science Foundation.

If you know of individuals or institutions that have a record of high-quality mentoring, especially as it relates to diversity, you are encouraged to submit a nomination. Candidates can be nominated by a colleague, administrator, or a student. Self-nominations also are accepted. The submission deadline is October 5, 2011. For more information go to http://grants.nih.gov/grants/guide/notice-files/NOT-OD-11-115.html.

HHS Releases Updated Conflict of Interest Rules for Federally Sponsored Research

The Department of Health and Human Services (HHS) has formally published updates to their Conflict of Interest Rules. The updated regulation will increase financial conflict of interest reporting requirements by federally funded researchers, including those funded by the National Institutes of Health (NIH). Universities and other institutions employing researchers will continue to be responsible for the collection of disclosure data, and institutions will take a greater role in ensuring that the conflict information is available to the public and reported to federal granting agencies.

Major changes to the 1995 regulations include a revised definition of significant financial interest (SFI), the extent of investigator disclosure, the information reported to the awarding entity, the information made accessible to the public, and investigator training on these requirements. The revised regulations:

- Require investigators to disclose to their institutions all of their significant financial interests related to their institutional responsibilities.
- Lower the monetary threshold at which significant financial interests require disclosure, generally from $10,000 to $5,000.
- Require institutions to report to the awarding entity additional information on identified financial conflicts of interest and how they are being managed.
- Require institutions to make certain information accessible to the public concerning identified SFIs held by senior/key personnel.
- Require investigators to complete training related to the regulations and their institution's financial conflict of interest policy.


Federally Sponsored Research


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- Require investigators to complete training related to the regulations and their institution's financial conflict of interest policy.


Dr. Collins also stated, “The NIH is committed to safeguarding the public’s trust in federally supported research that is conducted with the highest scientific and ethical standards. Strengthening key provisions of the regulations with added transparency will send a clear message that NIH is committed to promoting objectivity in the research it funds.”

HHS has allowed for a one-year implementation period for universities and other institutions to set up mechanisms to adhere to the new guidelines. Compliance with the updated rules must occur by August 24, 2012.

AHRQ Comparative Effectiveness Review of Sleep Apnea Diagnosis and Treatment

HHS’s Agency for Healthcare Research and Quality (AHRQ) has released a new comparative effectiveness review that examines sleep apnea diagnosis and treatment. This report is based on a systematic review of 234 clinical studies, 190 of which related to sleep apnea treatment.

Comparative Effectiveness Review of the Diagnosis and Treatment of Obstructive Sleep Apnea in Adults, prepared by researchers at the AHRQ-supported Tufts Evidence-based Practice Center systematically reviewed evidence addressing key questions on obstructive sleep apnea (OSA) diagnosis and treatment. Key findings include:

- OSA has been correlated with all-cause mortality and diabetes. More specifically, severe OSA, defined as an Apnea-Hypopnea Index (AHI) greater than or equal to 30 events/hour is a predictor of all-cause mortality and a high baseline AHI is correlated with diabetes.
- CPAP remains the most effective treatment for sleep apnea and is superior to MAD in improving sleepiness and lowering AHI values.
- In order to be effective, the CPAP must be used during every sleep session. CPAP treatment suffers from low compliance, but there is insufficient evidence to evaluate compliance with other treatment options.
- MADs also improve sleepiness and lower AHI values, and can still serve as a treatment option for OSA, although they are not as effective as CPAP MADs also have side effects of their own.
- Other treatment options, such as surgery and drug therapy, are available, and they may be effective, but there is insufficient evidence to compare the effectiveness and safety of these treatment options. The research notes that all treatment options carry side effects.
- Weight-loss programs seem to be a promising treatment for OSA, for patients who are obese.

Given more than 12 million Americans suffer from OSA, which dramatically impacts quality of life, greater efforts, including clinical trials, are warranted to address the current gaps in knowledge related to assessing the effectiveness of sleep apnea treatments. The information in this CER, including the discussion of current research needs, may help inform future research in this area.

AHRQ’s new materials on sleep apnea were developed by the Agency’s Effective Health Care Program, which represents an important Federal effort to compare treatments for health conditions and make the findings public. The program is intended to help patients, doctors, nurses, pharmacists, and others work together to choose the most effective treatments. Visit www.effectivehealthcare.ahrq.gov to read this report, learn more about AHRQ’s patient-centered outcomes research and download other materials.

T32 Training Program for Institutions That Promote Diversity

This funding opportunity aims to increase the participation of individuals from diverse backgrounds in cardiovascular, pulmonary, hematologic and sleep disorders research across the career development continuum. The NHLBI’s T32 Training Program for Institutions That Promote Diversity is a Ruth L. Kirschstein National Research Service Award Program intended to support training of predoctoral and health professional students and individuals in postdoctoral training at non-research intensive institutions with an institutional mission focused on serving diverse communities that are not well represented in NIH-funded research, or identified federal legislation of same, with the potential to develop meritorious training programs in cardiovascular, pulmonary, hematologic, and sleep disorders. The NHLBI’s T32 Training Program for Institutions That Promote Diversity is designed to expand the capability for biomedical research by providing grant support to institutions that have developed successful programs that promote diversity and that offer doctoral degrees in the health professions or in health-related sciences. Go to http://grants.nih.gov/grants/guide/rfa-files/RFA-12-032.html for additional information.

2012 NIH Director’s Pioneer Award Program (DP1)

The NIH Director’s Pioneer Award program complements NIH’s traditional, investigator-initiated grant programs by supporting individual scientists of exceptional creativity who propose pioneering and possibly transforming approaches to addressing major biomedical or behavioral challenges that have the potential to produce an unusually high impact on a broad area of biomedical or behavioral research. To be considered pioneering, the proposed research must reflect substantially different scientific directions from those already being pursued in the investigator’s laboratory or elsewhere. Awardees must commit the major portion (at least 51%) of their research efforts to the Pioneer Award project. For additional information about this funding opportunity, go to http://grants.nih.gov/grants/guide/rfa-files/RFA-RM-11-004.html.

2012 NIH Director’s New Innovator Award Program (DP2)

The NIH Director’s New Innovator (DP2) Award program was created in 2007 to support a small number of early stage investigators of exceptional creativity who propose bold and highly innovative new research approaches that have the potential to produce a major impact on broad, important problems in biomedical and behavioral research. The New Innovator Awards complement ongoing efforts by NIH and its Institutes and Centers to fund early stage investigators through R01 grants, which continue to be the major sources of NIH support for early stage investigators. The NIH Director’s New Innovator Award Program is a High-Risk Research initiative of the Common Fund.

Basic Research on Decision Making: Cognitive, Affective, and Developmental Perspectives (R01)

This Funding Opportunity Announcement, issued as part of the NIH Basic Behavioral and Social Sciences Opportunity Network (OppNet), encourages research grant applications that propose to increase understanding of the basic cognitive, affective, motivational, and social processes that underlie decision making across the lifespan. This includes an appreciation of the interactions among the psychological, neurobiological, and behavioral processes in decision making. It also includes consideration of the mediating and/
Healthy Habits: Timing for Developing Sustainable Healthy Behaviors in Children and Adolescents (R01/R03/R21)

This Funding Opportunity Announcement is to encourage Research Project Grant (R01) applications that employ innovative research to identify mechanisms of influence and/or promote positive sustainable health behavior(s) in children and youth (birth to age 18). Positive health behaviors may include: developing healthy sleep patterns, developing effective self-regulation strategies, adaptive decision-making in risk situations, practicing proper dental hygiene, eating a balanced and nutritious diet, engaging in age-appropriate physical activity and/or participating in healthy relationships. Applications to promote positive health behavior(s) should target social and cultural factors, including, but not limited to: schools, families, communities, population, food industry, age-appropriate learning tools and games, social media, social networking, technology and mass media. Topics to be addressed in this announcement include: effective, sustainable processes for influencing young people to make healthy behavior choices; identification of the appropriate stage of influence for learning sustainable lifelong health behaviors; the role of technology and new media in promoting healthy behavior; identification of factors that support healthy behavior development in vulnerable populations, identification of barriers to healthy behaviors; and, identification of mechanisms and mediators that are common to the development of a range of habitual health behaviors. Given the many factors involved in developing sustainable health behaviors, applications from multidisciplinary teams are strongly encouraged. The ultimate goal of this FOA is to promote research that identifies and enhances processes that promote sustainable positive behavior or changes social and cultural norms that influence health and future health behaviors. View the full RFA via the following link: http://grants.nih.gov/grants/guide/pa-files/PA-11-327.html

Systems Science in the Behavioral and Social Sciences (R01 and R21)

This Funding Opportunity Announcement (FOA) encourages Research Project Grant (R01 and R21) applications from institutions/organizations that propose to develop basic and applied projects utilizing systems science methodologies relevant to human behavioral and social sciences and health. This FOA is intended to encourage a broader scope of topics to be addressed with systems science methodologies, beyond those encouraged by existing open FOAs. Research projects applicable to this FOA are those that are either applied or basic in nature (including methodological development), have a human behavioral and/or social science focus, and feature systems science methodologies.


RFI – Input into the Deliberations of the Advisory Committee to the NIH Director Working Group on the Future Biomedical Research Workforce

The Advisory Committee to the NIH Director (ACD) has established a working group to examine the future of the biomedical research workforce in the United States (see http://acd.od.nih.gov/bwf.asp for charter and roster). The group will gather information from various sources including the extramural community, and will develop a model for a sustainable, diverse, and productive U.S. biomedical research workforce using appropriate expertise from NIH and external sources. The model will help inform decisions about how to train the optimal number of people for the appropriate types of positions that will advance science and promote health. The working group will recommend actions to the ACD and to the NIH Director. To view additional information on this RFI, click on the following link: http://grants.nih.gov/grants/guide/notice-files/NOT-OD-11-106.html

Responses are due by October 7, 2011.

NHLBI Working Group Explores Alternative Institutional Review Board Models

The National Heart, Lung, and Blood Institute (NHLBI) convened a Working Group (WG) of invited external experts in heart, lung and blood research and clinical research oversight, bioethics, health economics, regulatory matters and information technology for a meeting June 28-29, 2011. The purpose of this Working Group was to explore and discuss existing information and metrics on alternative Institutional Review Board (IRB) models and to discuss optimization of the IRB review process as one way to facilitate the conduct of NHLBI-funded human subjects research. An IRB review process executive summary is available on the NHLBI website.

NHLBI Working Group on Data Coordinating Centers’ Best Practices

The National Heart, Lung, and Blood Institute (NHLBI) hosted the Data Coordinating Centers’ Best Practices Working Group to identify and create a compendium of best practices for Data Coordinating Centers (DCC) that support large clinical trial programs such as Networks or multicenter clinical studies. The compendium will serve as a resource to NHLBI Program Staff for crafting application and review criteria for RFAs/RFPs and when evaluating DCCs as part of a large clinical trial program. The DCC is often the nucleus for the success of a large clinical research program. The DCC brings expertise in clinical trial design and conduct needed to complement the clinical investigators’ content expertise, and structure and quality standards to the design and conduct of a trial.

Education Research in Sleep Health and Sleep-Circadian Biology (R25)

The National Heart, Lung, and Blood Institute and the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) invites the submission of Education Research (R25) grant applications focused on scientific advances in sleep health and circadian and sleep biology. Proposed projects may include the development of innovative education tools, platforms
and programs that will transfer health information and scientific advances in sleep and circadian biology to research scientists, health care providers, educators from diverse disciplines, and to specific populations including youth, older adults, women, racial and ethnic minorities, and veterans. Projects should draw upon cutting-edge education, knowledge transfer, or social marketing models and must include analytic plans for the assessment of program efficacy and plans for adoption and sustained implementation in other settings.

This initiative aims to accelerate the transfer of recent scientific advances and established knowledge in sleep health and circadian and sleep biology to the scientific community and the public at large. This will be accomplished with the development of innovative educational tools and programs. Applicants may propose to develop tools and strategies to facilitate team science partnerships; enhanced approaches to integrate concepts into evidence based practice; advance community awareness through broader public health initiatives; or decrease sleep health disparities and improve health equality. Successful programs will have plans for portability and adoption in multiple settings and have built in education research methodology to evaluate validity and efficacy.


**NIH is Soliciting Input on the Future of the Biomedical Research Workforce**


Organizations and institutions representing groups of sleep researchers may want to consider weighing in on the specific issues identified in the NIH RFI announcement?

Deadline for response is Oct 17, 2011.

When submitting a response please also cc: Twery@nih.gov so that NCSDR can also benefit from your input.

**Register for the SleepRFA-L Listserv**

Are you interested in receiving the most up-to-date sleep-related grant offerings from Federal Agencies? If so, consider signing up for the SleepRFA-L Listserv. Signing up is easy and can be done via the following link, https://list.nih.gov/cgi-bin/wa.exe?A0=SLEEPRFA-L, then click on the “subscribe” button in the right-hand margin.
Background

The Sleep and Development Laboratory (established in 2010) is housed in the Department of Integrative Physiology at the University of Colorado Boulder, which is also home to the Sleep and Chronobiology Laboratory directed by Kenneth P. Wright, Jr., PhD. Dr. LeBourgeois and her research team focus on early childhood, a period of rapid developmental change in brain structure and function, as well as in children’s emotion processing, language, cognition, and sleep regulation. Many of the first signs of poor health and developmental disturbance appear when children are young, which places them at-risk for lifelong consequences. Although it is well-recognized that the sleep and circadian systems play a role in optimal mental and physical health in adults, less is known about such relationships in young children. We are pursuing several lines of research in order to develop an integrative, longitudinal understanding of the co-development and co-regulation of such processes in an effort to uncover important points of entry for the prevention and treatment of mental illness and physical disease.

Current Research

One line of research longitudinally examines changes in sleep homeostasis and circadian rhythms across early childhood using daytime nap/overnight sleep EEG recordings and dim light salivary melatonin assessments. A second line of research involves the behavioral and physiological effects of sleep restriction on young children’s emotion processing and stress reactivity. A third line of research examines brain connectivity and its relationship to sleep in childhood. Our team also collaborates with other research groups performing large-scale investigations of the social/demographic predictors of bedtime routines and sleep, as well as relationships between sleep and health/developmental outcomes (e.g. asthma, obesity, emotion regulation) in at-risk children.

Technical Capabilities

Our current studies require transforming family’s homes into virtual laboratories. We are equipped to perform ambulatory studies of sleep and circadian physiology, as well as behavioral assessments of children’s emotion processing. For daytime nap and overnight sleep studies, we use portable light-weight EEG recorders, high-density EEG, actigraphs, and infrared video. For circadian melatonin phase assessments, children have fun helping us create a dim-light “cave” out of their homes by covering windows with black plastic and installing dimmer switches on light sources. The Department of Integrative Physiology has several wet labs capable of performing standard ELISA and RIA assays of melatonin and cortisol. The University of Colorado’s new state-of-the-art 3 Tesla MRI facility is located less than a mile from the laboratory, thus, enabling us to perform MRI and fMRI studies with children.

Training Opportunities

Our team is comprised of highly-motivated trainees who work hard, while at the same time take advantage of the many rich out-
door activities in the Boulder, CO area. Students may enroll in one of three graduate programs in Integrative Physiology (concurrent BS/MA, MS, or PhD), and post-doctoral research fellowships are supported through federal and foundation grants.

**Selected Publications**


Background

The Sleep/Wake Research Centre was founded in 1998 by Professor Philippa Gander at the University of Otago’s Wellington School of Medicine. The Centre moved to Massey University in February 2003, joining four other externally-funded research centres to form the Massey School of Public Health. The Centre is a multi-disciplinary team dedicated to improving health, performance, safety and well-being through a programme of basic and applied research focused on five themes: 1) relationships between sleep and waking function; 2) the role of the circadian biological clock in the regulation of both sleep and waking function; 3) sleep across the lifespan; 4) epidemiology of sleep disorders in New Zealand, their societal consequences, and health system approaches to managing them; and 5) effects of work on the circadian clock and sleep, the consequences for health, productivity, and safety, and scientifically-based approaches for improving shift work and fatigue risk management.

Current Research

Current research reflects the varied background and interests of Centre staff, and includes projects addressing:

- fatigue risk management and error reduction in transportation and health care;
- sleep disorders - prevalence, risk factors, consequences, treatment, and health service delivery;
- sleep across the lifespan - during pregnancy and post partum, sleep of infants, school aged children, and adolescents, and sleep in elderly dementia patients and their caregivers;
- basic sleep and circadian science - circadian phenotypes, sleep inertia, the effects of altitude on sleep, cross-validation of sleep monitoring techniques for field research, novel EEG analytical techniques;
- research ethics and methodology - methodologies and research processes which are responsive to the needs of Māori and other community and stakeholder groups; and
- arts/science collaboration - an ongoing series of projects exploring the intersection between sleep and circadian science, the performing arts, and science communication.

Some Current Projects

The E Moe, Māmā: Maternal Health and Sleep in Aotearoa/New Zealand Project is a large-scale questionnaire survey investigating changes in sleep during late pregnancy and early post-partum and its relationship to maternal health outcomes, including duration of labour and medical intervention at birth and postnatal mood. In conjunction with this, a smaller scale study (PIPIS) is trialling a behavioural-educational intervention aimed at improving sleep in the early days postpartum. PIPIS involves collecting objective data from 40 mothers and infants at 6 and 12 weeks after birth (funded by the Health Research Council of New Zealand).
Sleep of older people with dementia and those who live with them. This project began with questionnaire and focus group studies that have led to the development and trialling of a community-based intervention to improve the entrainment of the circadian pacemaker of people with dementia, with the aim of improving consolidation of their sleep at night, thereby improving their waking function as well as the sleep and wellbeing of their family caregiver. The intervention, conducted in collaboration with Alzheimers Wellington, involves scheduled light exposure and physical activity, sleep education, sleep monitoring (actigraphy and diaries), and questionnaire assessments. The project has received funding from the Massey University Research Fund, Alzheimers New Zealand, the Maurice and Phyllis Paykell Trust, and the Health Research Council of New Zealand.

Studies for several airlines are in progress to monitor the sleep, PVT performance, and subjective sleepiness and fatigue of flight and cabin crewmembers before, during, and after long range and ultra-long range flights. These studies build on a body of previous work at the Centre that is contributing to the implementation of a new scientifically-based international regulatory framework for Fatigue Risk Management Systems (FRMS) in commercial aviation. This work is funded by the airline partners, with previous support from the International Air Transport Association, the International Federation of Airline Pilots Associations, the Boeing Company, and the Singapore Civil Aviation Authority.

The Centre has a small 3-bed time isolation unit in which we have recently conducted two studies evaluating the magnitude and time course of sleep inertia after waking from naps of different durations under operationally relevant conditions (napping during a night shift and napping after about 30 hours of wakefulness during an extended operation). Analyses are ongoing, with an additional focus on trait-like individual differences in sleep (normal nocturnal sleep and nap sleep), and in responses to extended wakefulness, and in sleep inertia. Funding for these studies has come from the United States Air Force Office of Scientific Research and company, and the Singapore Civil Aviation Authority.

Circadian Rhythm Sleep Disorders in Aotearoa/New Zealand. An initial study estimated the prevalence, risk factors and consequences of Advanced and Delayed Sleep Phase Disorders in a national survey of 9,100 Maori and non-Maori adults aged 20-59 years randomly selected from the New Zealand electoral rolls. A second study is investigating the feasibility of using blue-light therapy in a community-based setting to shift sleep timing and the core body temperature rhythm in individuals with self-reported late sleep timing who wish to advance their sleep. Funding is from the Health Research Council of New Zealand and the Lottery Health Board.

Developing Sleep Services that Meet the Needs of Maori: A feasibility study: This study builds on our epidemiological surveys of sleep problems in New Zealand and aims to develop a framework for reducing inequalities in the prevalence of OSA between Maori and non-Maori adults by focussing on improving health service provision. Funded by the Health Research Council of New Zealand.

Training Opportunities

We are passionate about the relevance of sleep to all aspects of health and wellbeing. The Centre is committed to the provision of world-class education and training opportunities for students and fellows from a broad range of disciplines. We are also working in collaboration with other academic departments and external organisations to develop a skilled workforce and to raise awareness of sleep issues among regulators, policy makers, health professionals and society at large.

In addition to hosting and supervising students at Masters and PhD level (in Public Health and in Psychology), the Centre teaches an undergraduate paper ‘Sleep, Circadian Rhythms and Shift Work’, for second year students across the health sciences. Two Masters level papers will be introduced in 2012: ‘Sleep Science in Healthcare’, and ‘Sleep Science in the Workplace’.

Selected Publications


The Sleep Research Society welcomes members who recently joined the organization. Our membership continues to grow — help us strengthen the impact of the profession by encouraging your colleagues to join. Information regarding membership can be found on the Society website (www.sleepresearchsociety.org).

Full Members

Xiang Gao, MD, PhD Harvard Medical School, Boston, MA  
Anne G. Wheaton, PhD Centers for Disease Control and Prevention, Atlanta, GA  
Rayleigh Ping-Ying Chiang, MD Shin Kong Memorial Hospital, Taipei, Taiwan  
    Clark J. Lee, JD University of Maryland, Baltimore, MD  
Kristen C. Stone, PhD Brown Alpert Medical School, Providence, RI  
Amado X. Freire, MD University of Texas Health Science Center, Memphis, TN  
    Colette S. Kabrita, PhD Notre Dame University-Louaize, Zouk Mosbeh, Lebanon  
Salma Batool-Anwar, MD Brigham and Women's Hospital, Boston, MA  
Diego Z. Carvalho, MD Porto Alegre, RS Brazil  
    Peggy S. Keller, PhD University of Kentucky, Lexington, KY

Associate Members

Robert L. Goodpaster Vanderbilt University, Nashville, TN  
    Jelle Laverge Ghent University, Gent, Belgium  
    Carline Risser Starlight Clinical Research, Sandy, UT

Post Doctoral Fellows

Karim Nahra, MD Coralville, IA  
    Angela L. McDowell, PhD University of Pittsburgh, Pittsburgh, PA  
    Simone Sarasso, PhD University of Wisconsin, Madison, WI  
    Eric C. Chua, PhD Duke-NUS Graduate Medical School, Singapore, Singapore  
    Marie-Eve Tremblay, PhD University of Wisconsin, Madison, WI  
Muhammad I. Farhan, MBBS, MD Wayne State University, Detroit, MI

Predoctoral Students

Erin Bremer University of Pennsylvania, Philadelphia, PA  
    Alexandria M. Reynolds University of South Carolina, Columbia, SC  
    Enrique Esqueda-Leon Universidad Autonoma Metropolitana, Mexico City, Mexico  
    Wai Kent Yeung Loughborough University, Leicestershire, United Kingdom  
    Forrest Armstrong Tucson, AZ  
    Jeffrey J. Guokas Madison, WI  
    Amy Storfer-Isser Perrysburg, OH  
    Cristina P. Munoz University of Michigan, Ann Arbor, MI  
    Joanna M. Hawryluk University of Connecticut, Storrs, CT  
    Le Guo Flushing, NY

Undergraduate Student

Garrett D. McKay University of Rhode Island, Kingstown, RI