Issue Highlights:

- APSS 2010 Summary
- Interview with the Editor: Outstanding Scientific Achievement Award Recipients Carlos Schenck, MD & Mark Mahowald, MD
- Presidential Task Force Update
- Sleep Research Highlight: Changes in Synaptic Strength Across the Sleep/Wake Cycle
The J. CHRISTIAN GILLIN, M.D. RESEARCH GRANT is intended to support beginning investigators in sleep research for the purpose of gathering pilot data to be used for future grant applications. The grant is intended for young investigators who do not already have substantial independent research funding. These one-year grants will be funded up to $20,000.

The 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 new criteria for the Weitzman grant makes it similar to a NIH R21 grant. This one-year grant will be funded up to $20,000.

Applications for these funding opportunities are due November 30, 2010.

For additional information regarding these grants, including application information, please visit the Sleep Research Society Foundation website at www.sleepresearchsociety.org/foundation.
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Dear Colleagues,

I would like to begin my first “Presidents Message” by thanking you for the trust and confidence you have placed in me by electing me to the position of President. It is a great honor to serve you in this capacity and I look forward to a productive year. I would also like to thank Clif Saper, MD, PhD for his exemplary service as President over the past year. Clif and I have worked very closely this past year to assure that SRS initiatives run smoothly through the change in officers, and I will continue this tradition with president-elect, Phyllis Zee, MD, PhD.

I would like to thank all of the SRS members who attended SLEEP 2010. The Annual SLEEP Meeting was a great success once again. Also, a heartfelt thank you goes to the members of the various SRS committees who took time out from the scientific sessions to attend committee meetings. The vast majority of the work of the SRS is done at the committee level and your willingness to volunteer your time and ability is greatly appreciated. I would also like to acknowledge the members of SRS Committees that concluded their service in June. The members, listed below by Committee, freely gave of their time and talents over the past three years to further the SRS and the field of sleep research. On behalf of your fellow members, I extend a hearty thank you for your dedicated service.

Communications Committee:
Steven Lockley, PhD;
J. Todd Arnedt, PhD;
Eileen Chasens, DSN;
Jun Lu, MD, PhD;
Hans Van Dongen, PhD

Educational Programs Committee:
Alon Avidan, MD;
Helen Burgess, PhD;
Naomi Rogers, PhD;
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Membership Committee:
Xinmin (Simon) Xie, MD, PhD;
Tat-Kong Wong, MD

Research Committee:
Luis de Lecea, PhD;
David Gozal, PhD;
Kristen Knutson, PhD;
Kristi Kohlmeier, PhD;
Naresh Punjabi, MD;
Jerome Siegel, PhD;
Robyn Stremler, PhD

Trainee Education Advisory Committee (TEAC):
Allan Pack, PhD, MBChB;
Amy Wolfson, PhD;
Sara Nowakowski, MS

Sonia Ancoli-Israel, PhD, (Chair) and the members of the 50th Anniversary Task Force, need to be recognized for the outstanding events they organized to celebrate the beginning of our 50th year as an organization and to commemorate our 50th meeting. The plenary presentation, “MemoryBlitz,” and reception were all well received and highlighted the rich history of the SRS. Thanks to each of you.

Last, but not least, I want to acknowledge the under-recognized contributions of SRS staff members Nick Cekosh, Anna Quintanilla, and Annie Walker-Bright, and executive director, Jerry Barrett. Little SRS activity occurs without the participation of one or more of these individuals, making the work of volunteer members easier and more productive.

With the summer over and the success of SLEEP 2010 behind us it is time to focus on the goals for the society over the coming year. During the SRS annual business meeting at SLEEP 2010, I presented a newly revised strategic plan for the SRS. One of the top priorities in the strategic plan is the continued development of SRS advocacy efforts. To this end, the SRS has been very active over the past several months.

Just prior to SLEEP 2010, the Government Relations Committee, Chaired by Fred Turek, PhD, organized a Congressional Liaison Group of 71 SRS members from across the country that live in the states and districts of key members of Congress. This group met for the first time at SLEEP 2010. Subsequently, this group of 71 volunteers has begun meeting with their U.S. Senators and Representatives. These meetings will help to develop relationships with our representatives, educate them and their staffs about the value of sleep research, and attempt to identify Members of Congress with a particular interest in the field because of a friend or family member with a sleep disorder. These visits are the first step in setting the groundwork for SRS to actively promote our field with the goals of increased research funding and fostering sleep-friendly public policy.

Interacting with Members of Congress is one part of our two-part strategy to enhance funding for sleep research. The other part of our strategy includes communicating the value of sleep and circadian research to NIH by establishing on-going communications among our members and Institute Directors and program staff. Currently,
planners are well underway to have members of the NIH Liaison Group travel to Bethesda in October and meet with Institute Directors and staff. The NIH Liaison group, like the Congressional Liaison Group, was organized by the Government Relations Committee. These meetings will focus more on cutting-edge science in our field and also the need to enhance the trans-NIH status of sleep and circadian research.

In addition to direct meetings with NIH Institute Directors and program staff, the SRS has been communicating with the Sleep Disorders Research Advisory Board (SDRAB) and the National Center for Sleep Disorders Research (NCSDR) as plans evolve for work on a new NIH Sleep Disorders Research Plan. We have worked closely with AASM President, Pat Strollo, MD and other AASM board members, to provide clear, consistent input in response to the NIH’s Request for Information (RFI) related to the new plan. Drafting an implementable plan that can be embraced across NIH Institutes is essential to the long-term health of the sleep and circadian research field, and it is essential that the plan reflect the input of a significant number of scientists in the field. That is why the SRS requested members submit comments to the RFI in July. Thank you to all of those who submitted comments. The volume of comments as well as the content demonstrates the enthusiasm of scientists and the value of research in our field. As an organization, the SRS also submitted comments on the new strategic plan, as did the AASM. The SRS has offered to work with and assist SDRAB and NCSDR in the process of drafting the new NIH Sleep Disorders Research Plan. We will be sure to relay any updates to you on this matter as we learn of them.

In addition to the above, advocacy efforts are a high priority because the SRS leadership believes these efforts, in the long-run, will help advance sleep research through the creation of tools and infrastructure such as a national network for sleep research, a national biobank, and a sleep gene chip. Nevertheless, we will not diminish attention to other organizational activities or goals.

Training of young scientists has long been a priority for the SRS. The Trainee Symposia Series is the most visible component of this effort and has been a “crown jewel” for SRS and the annual SLEEP meeting for a number of years. Dr. Jennifer Martin and the Trainee Education Advisory Committee, once again, developed and hosted an amazing training experience in San Antonio last June. Now that the schedule for the annual Sleep meeting has been altered (ending Wednesday afternoon) the board of directors is working with Dr. Martin and TEAC to adjust the structure of the Trainee Symposia Series for SLEEP 2011 to enable additional trainees to attend and fulfill a need for additional career development workshops.

The coming year will present many opportunities and challenges for the SRS. I look forward to working with our members to take advantage of opportunities and face down challenges while continually moving our field forward. I encourage you to volunteer and become involved with the SRS whether on a committee or as part of our Congressional Advocacy efforts. The strength of our organization depends upon the efforts of our volunteers. If you wish to become more involved in the SRS contact Nick Cekosh (ncekosh@srsnet.org) at the national office.

Sincerely,

James K. Walsh, PhD
President
Introduction

The notions that circadian rhythms are important for sleep, and that sleep is a prime example of circadian rhythmicity, are widespread. At the same time sleep and circadian rhythmicity are often viewed as somewhat separate areas of research and to reflect different aspects of physiological organization. The lecture provided an overview of some of the research I have been involved with over the past 25 years or so. The main question addressed during this period has been ‘How do the sleep and circadian systems interact?’ An obvious requirement for this type of research is the simultaneous measurement of many sleep and circadian variables and to always consider the sleep-wake cycle within the 24-h context. The research was conducted at the University of Groningen, the University of Zurich, Harvard Medical School, the University of Surrey, and more recently in collaboration with the University of Liege. I started my PhD research in 1983 and was inspired by the qualitative (1) and quantitative version (2) of the two-process model of sleep regulation as well as the early human circadian sleep studies (3-5) which had then just been published. This is an ongoing research effort and these are some of my interim conclusions and views.

Pervasive effects of circadian rhythmicity on sleep and wakefulness

The circadian system is sometimes portrayed as a ‘clock’ which times behaviours. However, assessment of sleep by polysomnography and quantitative EEG analysis, demonstrates that the impact of circadian rhythmicity extends well beyond its effects on the timing of sleep. The effects of the circadian system include modulation of sleep latency, sleep consolidation, sleep duration, REM sleep, the density of rapid eye movements during REM sleep, EEG alpha activity in REM sleep, sleep spindles and to a lesser extent EEG activity in the slow wave and other frequency ranges in NREM sleep (6-8). These circadian effects are observed during desynchrony of the sleep-wake cycle and circadian rhythms, which allows for analyses in which effects of prior wakefulness and sleep can be accounted for. In other words, many aspects of sleep are profoundly influenced by the circadian phase at which we sleep. It is therefore difficult to imagine that recovery processes occurring during sleep or other processes such as memory consolidation will be independent of the circadian phase at which we sleep.

Pervasiveness of circadian effects has also been demonstrated by assessment of brain function during wakefulness through performance measurements and quantitative EEG analysis. Our ability to add numbers or sustain attention or to perform on a memory task depends on circadian phase, even when effects of prior wake duration are accounted for (9). Likewise, the spectral composition of EEG oscillations assessed under carefully controlled behavioural conditions exhibits a high amplitude rhythm in close association with the circadian rhythm of plasma melatonin (10). The waking brain during the biological night is very different from the waking brain during the biological daytime. Implementation of other brain imaging approaches such as fMRI in circadian protocols such as constant routines or forced desynchrony, will most likely shed more light on the extent by which the brain is influenced by circadian processes.

Sleep homeostasis and circadian rhythmicity interact during sleep and wakefulness

Sleep homeostasis refers to the processes which maintain variables related to sleep within a reference range. It is most commonly investigated by manipulating the duration of wakefulness and sleep although the ‘intensity’ and ‘quality’ of wakefulness and sleep have been considered as well. In the context of the interaction of sleep regulatory processes and circadian rhythmicity, sleep homeostasis has been operationally defined as the history of sleep and wakefulness. The main question to be answered was ‘How do the duration of wakefulness and sleep together with circadian phase determine the characteristics of sleep and wakefulness?’ The main conclusion is that sleep homeostasis and circadian rhythmicity do not simply add up, they interact! This implies that for example having to perform at the peak of the circadian sleep propensity rhythm, e.g. 6 am, is not that difficult when we have been awake for only a few hours. It is, however, extremely difficult to perform at this circadian phase when we have been awake for 20 hours or even longer (8;11-13). Thus it appears that at this circadian phase the negative effects of prior wakefulness on brain function are amplified by the circadian system. By contrast, during the wake maintenance zone, i.e. just before the onset of nocturnal melatonin secretion, performance is remarkably resilient against the effects of sleep loss. At this circadian phase the circadian system appears to be able to protect the brain, or at least the performance produced by the brain, from the negative effect of prior wakefulness. Similar arguments apply to the consolidation of sleep. Thus at the temperature nadir, sleep will remain consolidated even when homeostatic sleep pressure has dissipated. By contrast, at the wake maintenance zone sleep will be disrupted (14).

The non-additive interactions between circadian phase and sleep homeostasis have been observed for many variables during both sleep and wakefulness. How, and in which brain areas or individual neurons, these interactions occur remains unknown. One implication of these complex interactions, which were not anticipated by either the quantitative or qualitative version of the two-process model, is that the separate contribution of sleep homeostasis and circadian rhythmicity is difficult to quantify. Another consequence of these interactions is that changes in sleep-wake history lead to changes in what would be considered a circadian phenotype. For example, when awake under high sleep pressure the apparent circadian amplitude of performance deterioration at night is greater than when living under lower sleep pressure. These considerations have implications for our interpretation of the effects of aging (15) as well as phenotypes such as morning and evening types (16-18). New mathematical models are now addressing some of these issues (19).
Polymorphisms in clock genes contribute to individual differences in diurnal preference and associated effects on sleep, cognition and fMRI assessed brain function in response to sleep loss

A major advance in circadian rhythm research has been the identification of a core set of genes involved in the generation of circadian rhythms. Early studies of sleep in animals in which these clock genes were manipulated indicated that although these animals could still respond to sleep loss, changes in this homeostatic response as well as change in sleep at baseline were observed [for a review see (20)]. In humans, inter-individual differences in diurnal preference are associated with variation in circadian variables, e.g. melatonin, and expression of clock genes in leukocytes and are predicted by a Variable Number Tandem Repeat (VNTR) polymorphism in one of these clock genes PER3 (21;22). This provides opportunities to investigate the interaction of sleep homeostasis and circadian rhythmicity in individuals selected on the basis of their PER3 genotype. When investigating the physiological consequences of this VNTR polymorphism we found that it did not appear to affect classical circadian markers, such as melatonin. It did, however, affect markers of sleep homeostasis such as EOG slow wave activity during sleep and theta activity during wakefulness. In addition, we observed a greater deterioration in performance in response to sleep loss with the genotype dependent difference being most pronounced in the morning hours just after the peak of the circadian melatonin rhythm (23;24). In an independent sample the polymorphism was also shown to affect fMRI assessed brain responses to an executive task following sleep loss (25). These data indicate that a change in a ‘clock gene’ affects many aspects of sleep and waking performance and that at this level circadian rhythms and sleep are very close together indeed.

Conclusion:
The study of human sleep within a context of circadian rhythmicity and sleep homeostasis has generated many protocols and data and it has been very rewarding to work with the many colleagues and collaborators in this exciting research area. The data show that sleep regulation and circadian rhythmicity are intertwined at the behavioural, physiological and molecular levels (23;26;27). The close interactions will require existing models and concepts to be refined or replaced and will hopefully stimulate continued interaction between the circadian and sleep fields.

Selected Relevant/Recent References:
22. Archer SN, Viola AU, Kyriakopoulou V, von SM, Dijk DJ. Inter-individual differences in habitual sleep timing and entrained phase of endogenous circadian rhythms of BMAL1, PER2 and PER3 mRNA in human leukocytes. Sleep 2008;31:608-17.
McMaster University in Hamilton, Ontario. He is currently a distinguished professor in the department of neurobiology, David Geffen School of Medicine at the University of California at Los Angeles, a member of the UCLA Brain Research Institute and a Past President of the Sleep Research Society. Dr. Harper's principal interests lie in neural mechanisms underlying control of breathing and cardiovascular action during sleep. He studies infants who are at risk for the sudden infant death syndrome, children who are unable to sustain ventilation during sleep (Congenital Central Hypoventilation Syndrome) and adults with obstructive sleep apnea and heart failure, principally using structural and functional magnetic resonance imaging procedures. He has also used animal models to examine basic neural processes regulating breathing and autonomic function.

Allan Rechtschaffen, PhD
Allan Rechtschaffen was born (1927) and raised in New York City and received his Bachelor and Masters degrees in psychology at the City College of New York. His first professional interests were in clinical research, which he pursued for the next three years during an internship at Cleveland State Hospital and a staff position at a Minnesota State Hospital. Then he returned to academia, earning a PhD in Psychology at Northwestern University. In 1957, he started as an Instructor at the University of Chicago, where he remained until his retirement as a Professor in 1999. Shortly after arriving at the University, Rechtschaffen learned of the new REM sleep research, fell in love with it, started his own sleep laboratory, and devoted himself primarily to the study of sleep for the remainder of his career.

Over the years, Rechtschaffen's laboratory pursued a large variety of sleep studies, including stimulation and correlates of sleep and dreams, dream phenomenology, interactions of sleep and circadian rhythms, and the physiology, phylogeny, deprivation and function of sleep. This variety attracted more than 50 graduate, undergraduate and postgraduate students in psychology, physiology, and medicine to work in the laboratory at one time or another for varying periods. Of these, 28 were graduate students who earned their PhD degrees under Dr. Rechtschaffen's supervision. Many former laboratory students moved on to full-time careers in sleep research or sleep disorder medicine, including Michael Aldrich, Bernard Bergmann, Donald Bliwise, Charmane Eastman, Carol Everson, Kyrstyna Hartse, Peter Hauri, Clete Kushida, Carol Landis, Ralph Mistleberger, William Obermeyer, June Pilcher, Richard Rosenberg, Paul Shaw, Robert Watson and Harold Zepelin. Established professionals who began or expanded their sleep research experience during extended periods in the lab included Ruth Benca, Ping-Fu Feng, David Foulkes, Carol Landis, Terry Pivik, Martin Scharf and Gerald Vogel. The adjoining laboratory of Barbara Jones during one period was a valuable teaching resource.

In retirement, Dr. Rechtschaffen enjoys playing competitive bridge; long conversations about current sleep research with old friends Bernard Bergmann, Michael Chase, Bill Dement, Tom Roth, Jerry Siegel and Gerry Vogel; and even longer conversations with wife Karen about everything else.

Mary A. Carskadon
Outstanding Educator Award
Allan Rechtschaffen was born (1927) and raised in New York City and received his Bachelor and Masters degrees in psychology at the City College of New York. His first professional interests were in clinical research, which he pursued for the next three years during an internship at Cleveland State Hospital and a staff position at a Minnesota State Hospital. Then he returned to academia, earning a PhD in Psychology at Northwestern University. In 1957, he started as an Instructor at the University of Chicago, where he remained until his retirement as a Professor in 1999. Shortly after arriving at the University, Rechtschaffen learned of the new REM sleep research, fell in love with it, started his own sleep laboratory, and devoted himself primarily to the study of sleep for the remainder of his career.

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In retirement, Dr. Rechtschaffen enjoys playing competitive bridge; long conversations about current sleep research with old friends Bernard Bergmann, Michael Chase, Bill Dement, Tom Roth, Jerry Siegel and Gerry Vogel; and even longer conversations with wife Karen about everything else.

Distinguished Scientist Award
Ronald Harper, PhD
Dr. Harper was born in New Brunswick, Canada and received his undergraduate degree at Dalhousie University in Halifax, Nova Scotia, his master's degree at Tufts University in Boston and his doctoral degree at Harvard University. He was an Instructor at the University of Chicago, where he remained until his retirement as a Professor in 1999. Shortly after arriving at the University, Rechtschaffen learned of the new REM sleep research, fell in love with it, started his own sleep laboratory, and devoted himself primarily to the study of sleep for the remainder of his career.

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Outstanding Scientific Achievement Award
Carlos Schenck, MD & Mark Mahowald, MD
Carlos H. Schenck, MD is a Professor of Psychiatry at the University of Minnesota Medical School in Minneapolis. He was born in New York City in 1951, graduated from the Johns Hopkins University in 1972, received his Medical Degree from the State University of New York at Buffalo in 1976, and completed a Psychiatry Residency at the University of Minnesota in Minneapolis in 1980. He has been a staff psychiatrist at the Hennepin County Medical Center since 1981 and a member of the Minnesota Regional Sleep Disorders Center (MRSDC) since 1982. Dr. Schenck served as Co-Chairman of the Parasomnias Committee for The International Classification of Sleep Disorders-2nd Edition, published by the American Academy of Sleep Medicine (AASM) in 2005. Dr. Schenck was a member of the AASM’s “Nosology Committee,” chairing the Parasomnias section, and he also was a member of the AASM Movement Disorders Task Force for the revision of the Rechtschaffen & Kales Polysomnography Scoring Manual that was published in May 2007. In April 2010, Dr. Schenck was elected President of the newly-formed International RBD Study Group.

Dr. Schenck and his colleague Mark W. Mahowald, MD received the William C. Dement Academic Achievement Award from the AASM during the SLEEP 2007 meetings in Minneapolis, for their work on RBD, Sleep Related Eating Disorder, and other parasomnias.

Dr. Mark W. Mahowald is the Director of the Minnesota Regional Sleep Disorders Center and Chief of the Department of Neurology at Hennepin County Medical Center, and Professor of Neurology at the University of Minnesota Medical School. His primary interest is in education of medical students, residents, and fellows, with particular reference to promoting the concept of a truly multidisciplinary sleep medicine program. Clinical research interests include parasomnias, state dissociation, and forensic sleep medicine, emphasizing the importance of close collaboration among clinicians, basic neuroscientists, and the legal profession.

Dr. Mahowald was a key figure in establishing the Minnesota Regional Sleep Disorders Center, the first sleep center in the Midwest. Subsequently, Dr. Mahowald worked successfully to incorporate sleep medicine into the Medical School curriculum at the University of Minnesota.

Dr. Frank A.J.L. Scheer, PhD

Dr. Frank A.J.L. Scheer is an Assistant Professor of Medicine at Harvard Medical School (HMS), an Associate Neuroscientist at Brigham and Women’s Hospital (BWH), and the Associate Director of the Medical Chronobiology Program at BWH. Dr. Scheer received his PhD in Neuroscience from the University of Amsterdam, The Netherlands, and his postdoctoral training in the laboratories of Drs. Charles A. Czeisler and Steven A. Shea at the Division of Sleep Medicine at BWH and HMS.

Dr. Scheer is primarily interested in medical chronobiology, including the underlying physiological mechanisms and therapeutic strategies. His work focuses on circadian and behavioral influences on cardiovascular, pulmonary, metabolic regulation and disease. Furthermore, he is interested in fundamental properties of the circadian timing system, including effects of light and melatonin.

Mark R. Smith, PhD, RPSGT

Mark R. Smith, PhD, RPSGT, completed his B.A with honors at Macalester College in 1999. After college he received training as a polysomnographic technologist at Hennepin County Medical Center, and became a Registered Polysomnographic Technologist in 2000. Under the mentorship of Charmane Eastman, PhD, he went on to complete his PhD in neuroscience in the Biological Rhythms Research Laboratory at Rush University Medical Center in Chicago, IL. His doctoral research focused on phase shifting the human circadian clock with different color temperature polychromatic lighting. While a graduate student, he also published a series of studies testing interventions designed to facilitate partial adaptation of the circadian clock to a night shift schedule.

Dr. Smith is dual member of the SRS and AASM, and has served on the SRS trainee day subcommittee multiple times. He was a recipient of SRS abstract excellence awards in 2006, 2007, and 2008, and in 2009 was awarded the AASM Circadian Rhythms Section Investigator Award. Dr. Smith is currently a post-doctoral fellow in the Sleep and Chronobiology Laboratory at the University of Colorado at Boulder. His current research focuses on the physiological and behavioral consequences of sleep restriction.

Tracy Rupp, PhD

Dr. Tracy Rupp received her BA in Psychology from Duke University. She completed her doctorate and masters degrees in Experimental Psychology at Brown University under the mentorship of Dr. Mary A. Carskadon, studying the cognitive effects of sleep restriction and the combined effects of wake extension and alcohol on cognitive performance. Dr. Rupp is currently a research psychologist in the Department of Behavioral Biology at the Walter Reed Army Institute of Research where she also completed her postdoctoral fellowship as a National Research Council Postdoctoral Research Associate under the mentorship of Dr. Thomas Balkin. Dr. Rupp received the National Sleep Foundation-Sleep Research Society Young Investigator award in Basic Research in 2008. Her research focus is on the effects of chronic sleep restriction on cognitive performance and executive function, recovery from these effects, individual differences in such responses to sleep loss, and the physiological mechanisms underlying these effects.
The **Sleep Research Society** (SRS) is a member-based organization of more than 1,200 scientists from a variety of disciplines committed to fostering scientific investigation on all aspects of sleep and its disorders, promoting training and education in sleep research, and providing forums for the exchange of knowledge pertaining to sleep. For 50 years the SRS has been the premier organization dedicated to sleep and circadian research.

The SRS is organized exclusively for scientific, educational and charitable purposes. Renew your membership in one of the most prestigious organizations in the field of sleep and circadian research.

**EDUCATION**
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**TRAINING**
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- Participate in other SRS educational opportunities offered to sleep researchers and medical professionals interested in learning more about sleep

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- The *J. Christian Gillin, MD, Research Grant* is available to your investigators gathering pilot data to be used for future grant applications
- The *Elliot D. Weitzman, MD, Research Grant* is intended to facilitate established researchers in developing novel and innovative lines of research that differ from their previous areas of research, similar to a NIH R21 grant.

*Renew your membership online at www.sleepresearchsociety.org*

For information or questions regarding membership renewal, please contact the SRS membership department at 630-737-9702 or SRSmembership@srsnet.org
Interview with the Editor

Mark W. Mahowald, MD and Carlos H. Schenck, MD

Editor: What does winning this award mean to you?

Mark W. Mahowald, MD and Carlos H. Schenck, MD: This was a very great and special honor - particularly for us as clinicians to be recognized by a basic science group. It underscores the benefits to both clinicians and basic scientists of close collaboration.

Editor: What achievements in your career stand out to you?

MWM and CHS: One thing that has been most gratifying is the more widespread acceptance of the concept of state dissociation - the fact that sleep and wakefulness are not mutually exclusive. Virtually all of the clinical research from our group over the past 30 years has been related to state dissociation, which explains many previously enigmatic human behaviors, and helps dispel many of the myths and stigmas attached to them.

Editor: Who were some of the researchers you admired in your early careers?

MWM and CHS: There are too many to list. Our initial observation of the REM sleep behavior disorder was greatly supported by Drs. William Dement, Robert McCarley, Allan Rechtschaffen, Michael Chase, and Adrian Morrison.

Editor: Who in particular influenced your careers?

MWM and CHS: We have been fortunate in having a number of mentors and role models. Dr. Milton Ettinger's support of the clinical sleep medicine program at our institution (Hennepin County Medical Center and Minnesota Regional Sleep Disorders Center) was critical. Collaboration with basic scientists, besides those just mentioned above, such as Jerry Siegel and Michael Corner, was also influential.

Editor: What scientific questions have interested you more recently and what projects will you be focusing on in the future?

MWM and CHS: State dissociation may result in behaviors with forensic implications. Currently, there is great disparity between the neuroscientific and legal understanding of such behaviors. The medical and legal professions will benefit mutually from advances made in the concepts of consciousness, awareness, intent, culpability and responsibility. There is fertile ground for close collaboration between neuroscientists and the legal system.

Editor: What do you think should be some of the research priorities for sleep and circadian researchers over the next 5-10 years?

MWM and CHS: Sleep deprivation remains a serious and growing problem from both a personal and societal level. Education and coping strategies about sleep deprivation are most important. The biologic underpinnings of the extreme individual variability in tolerance of sleep deprivation and shift work may lead to therapeutic interventions. The development of chronobiotics would be of immense value to those with circadian rhythm disorders, shift workers, and to those who frequently cross time zones.

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

MWM and CHS: Enthusiasm, passion, and focus for one's interests are invaluable. Collaboration with more senior investigators who can serve as mentors is very important, as is working with investigators in other areas. Cross-fertilization between basic research and clinical investigators should be considered a priority. The annual APSS meetings offer a special opportunity for enhancing this process, and participants should be encouraged to attend a broad spectrum of basic science and clinical presentations at these meetings.

Editor: What is the hardest part of your job?

MWM and CHS: The relentlessly increasing financial pressures of clinical medicine are making clinical research activities more difficult.

Editor: What/when was the “aha” moment when you knew you were successfully contributing to society?

MWM and CHS: When we were able to provide systematic educational activities for medical students, residents, and fellows and when we were asked to make presentations at national and international meetings concerning our research findings on the parasomnias and dissociated states of being. Also, particularly gratifying was our reporting of therapies that reliably and safely controlled the various parasomnias, such as RBD and sleep related eating disorder, which we had identified and named. As clinicians, the top priority is our patients, and so properly diagnosing them and alleviating their symptoms and allowing them to sleep well and without harm have been overriding concerns. Knowledge of basic science findings has greatly assisted us in this process.

Editor: How do you keep striving for that in the midst of competing distractions?

MWM and CHS: Enthusiasm, passion, and focus are important, as is close collaboration with clinical and research investigators from diverse backgrounds.
Recap of 50th SRS Anniversary Events

The 50th Anniversary of the Sleep Research Society

June 2010 marked the beginning of the 50th anniversary year of the Sleep Research Society. The celebration began at the 50th meeting of the SRS in June 2010 in San Antonio. As chair of the Presidential Task Force for the 50th Anniversary of the Sleep Research Society, I had the honor of addressing the attendees at the opening ceremony. I reviewed some of the history of the SRS and I’d like to repeat some of that here, particularly for those who could not attend, and for future generations of trainees and young investigators. I feel strongly that we must know our history in order to know where we are going. So, here are some excerpts from my words that day.

Our very first sleep meeting took place 50 years ago in 1961 in Chicago. Al Rechtshaffen organized that first meeting with 36 attendees. Compare that to the current SRS membership of 1217 and the current meeting registration of over 4000. We have indeed grown over the last 50 years.

In late 1962 or 63 that small informal group of sleep researchers became a bit more organized and became the APSS. Some of you may not know that the original name of the SRS was APSS.

But that APSS stood for the Association for the Psychophysiological Study of Sleep. Joe Kamiya, who was then in Chicago, became the first Secretary-Treasurer – the only official position – of the group. When the APSS first started, its energies were directed towards establishing national and international forums for dialogue and cross fertilization among sleep researchers. Abstracts were mimeographed and handed out.

Let me tell you a few anecdotes from the early meetings. At that very first meeting in Chicago, Al Rechtshaffen managed to find rooms for all 36 attendees – at $5.00 a night. Boy – times have changed, haven’t they! At the meeting in Sante Fe in 1969 there was a scrimmage football game between Stanford and University of Chicago – the two great centers which gave birth to sleep research. Stanford won 6-0, but later in the evening Dr. Gerry Vogel, another of our founding fathers, made a toast and announced that although the score was 6-0, it wasn’t statistically significant and therefore did not count as a win. At the Minnewaska meeting, in the Catskill Mts in Upper NY State, the electricity went out in the middle of the meeting, but it didn’t seem to matter and the meeting went on – after all, sleep researchers are used to working in the dark.

And there are so many other anecdotes. For example, the first woman to have her sleep recorded was Pat Dement, Bill Dement’s wife. You see, Dr. Nathaniel Kleitman, the founder of sleep research, thought it wasn’t right if a man recorded a woman sleeping, so only after Bill and Pat got married, was he able to record a woman’s sleep. Or the fact that Bill Dement’s first sleep lab, supported by the NIH, was in a 5-bedroom apartment on Riverside Drive in NY. For one of the studies the subjects were the NYC Rockettes – imagine the doorman seeing a different Rockette walking in each night, and leaving the next morning.

In the early days, SRS was an international meeting and in conjunction with the European sleep societies, met every four years outside of the northern hemisphere beginning in Brugge, Belgium in 1971, followed by Edinburgh, Tokyo, Bologna, Italy, Mexico City and Copenhagen.

In 1972, the Brain Information Service at UCLA and Michael Chase made a substantial contribution to the field by initiating an annual publication called Sleep Research. There are 31 volumes, which sit on many of the bookshelves of those of us who have been around for a while. These volumes included the publication of complete abstracts from that year along with a compendium of each year’s sleep literature. Only in 1998 did the abstracts begin being published in the journal Sleep. Michael Chase also started the Arrowhead meetings which were wonderful venues for trainees to meet with more seasoned sleep researchers in a relaxed atmosphere.

Now, what about our journal, SLEEP? Between 1972 and 1977 there was great controversy as some people believed we didn’t need a publication devoted to sleep research. But in 1977, 16 years after the first small meeting, the group voted to establish a journal and the journal SLEEP was born. Christian Guilleminault and Bill Dement were the first editors (and as the story goes, Christian and Bill took over after a search turned up no other candidates). A contract was signed with Raven Press, but, Christian and Bill had to agree to take personal liability for all debts of the publication. Luckily the journal was a success and they didn’t lose the clothes on their backs. The cover, by the way, went through all sorts of developmental changes and colors, including hot pink!
Around 1972, the number of professionals interested in clinical aspects of sleep had grown and an off-shoot meeting was started. Many of the members of SRS, or APSS as it was still called, attended both the research meetings and the clinically oriented meetings. Finally, in 1985, we formed a joint organization made up of partners, the SRS – Sleep Research Society, the ASDC – Association of Sleep Disorders Centers (whose members were sleep centers, not individuals), the CSS, Clinical Sleep Society which was the branch of the ASDC for individuals, and the APT, Association of Polysomnographic Technologists. It was only later that the ASDC became the ASDA - American Sleep Disorders Association and then later again the AASM – American Academy of Sleep Medicine and the APT became the AAST – American Association of Sleep Technologists.

At the time of the merger, 14 individuals met in a hotel room in St. Louis (this was January 13, 1986), and signed the agreement. Howard Roffwarg, who had guided the merger and federation for several years, stood up and accounted with some excitement: “We have a federation!”

As it stated in the first APSS newsletter (which is liberally quoted from here), “the APSS was founded to encourage and foster all sleep/wake related interests, to meet the needs of all its members and to put on an annual meeting that knocks everyone’s socks off with the latest in science, clinical practice and technical and social issues.” And I think we are still doing that.

The first annual event of the new APSS – Association of Professional Sleep Societies was held in Columbus, Ohio, in 1986. And since then Sleep Research and Sleep Medicine continue to be closely aligned.

When outsiders come to our meetings, they never fail to mention that we are the friendliest, least competitive group they have ever seen. Our members don’t come to the meeting to play golf – they come to learn, to interact, to network. Many of us have been around a long time, grieved when we started having multiple sessions and couldn’t go to all the talks. But that is part of growth and growth is always a good thing.

Growing trainees has always been a primary goal of the SRS. For the last few decades, the single largest budget item for the SRS has been support of our trainees. You would be amazed at how many of our former and current leadership started out as SRS trainees (such as former president Eric Notzinger, Martica Hall, Kenneth Wright, Sean Drummond, former AASM president Clete Kushida, Michael Perlis, Janet Mullington, Jennifer Martin, Gina Poe, Robbie Green, and many, many others).

The other goal of the SRS is to fund research – after all, that is what we are all about, research. For that purpose the SRS formed the SRS Foundation which awards grants, two of which are named after two of our dear members who were also founders in the field and whom we lost all too early, Elliot Weitzman and Chris Gillin. And we have other named awards which we give out each year, including the Distinguished Scientist Award, the Outstanding Scientific Achievement Award, the Young Investigator Award, and the Mary A. Carskadon Outstanding Educator Award.

In 1986, Howie Roffwarg – editor of the first APSS newsletter said – “the SRS can take pride in having been the breeding ground for the AASM and current APSS. We firmly believe that the sleep scientist is still a vital commodity. The need for basic research may be greater now than ever. We are certain that the joining of clinicians and researchers strengthens the relevance and significance of all our work.”

That statement was true in 1986 and is still true today.

So, in celebration of the 50th year of the SRS, we will be having a year long celebration. At the meeting in San Antonio, Martica Hall, with help from Gina Poe, organized and videotaped interviews with many of our founding members: Alan Rechtshaffen interviewed by Charmagne Eastman; Bill Dement interviewed by Tom Roth, René Drucker-Colín, interviewed by Howard Roffwarg, Ernest Hartmann interviewed by Allison Harvey, Peter Hauri interviewed by me and Wally Mendelson interviewed by Kenneth Wright. During the year, interviews will also be conducted with other founding members including Rosalind Cartwright, Gerry Vogel, Alexander Borbély, Roger Broughton, Irwin Feinberg, Alan Hobson, Barbara Jones, Michel Jouvet, Anthony Kales, Milton Kramer, David Kupper, Elio Lugaresi, Robert McCarley, Howard Roffwarg and Bernie Webb. Check out the SRS website each month for a peek into the history of our field as we debut each interview.

Also at the meeting in San Antonio, SRS members were given a gift – a CD with copies of the abstracts from the first meeting, which were painstakingly put together by Howie Roffwarg. Also on the CD were copies of 24 seminal articles published prior to the 1960’s. That effort was spearheaded by Tom Roth.

Before I end, I would like to publicly thank some people. First – the NIH who has supported sleep research continuously since 1951. There are many other funding agencies as well that we would want to thank, but the NIH has been the one, as far as I know, who has supported us the longest. Thank you to Michael Vitiello, who asked me to chair this presidential task force when he was President of the SRS. I also want to thank Clif Saper, (SRS president during the year we worked on this event) and Jim Walsh (current president) for their support this past year.

I would also like to thank our SRS Executive Director, Jerry Barrett and staff members Nick Cekosh, Anna Quintanilla and Annie Walker-Bright for the enormous help and support they gave us.

And last but certainly not least, my committee for all their hard work and dedication towards making this a memorable celebratory year: Don Blwise, Melissa Burnham, Mary Carskadon, Sean Drummond, Martica Hall, Robert McCarley, Gina Poe, Howard Roffwarg, Thomas Roth, and Kenneth Wright.

As it said in that first APSS newsletter in 1986 – “The future looks good!” Here’s to the next 50 years.
Like those early explorers, the scientists of today don’t always know what lays ahead, but their pursuit of knowledge drives them ever closer to new, profound discoveries every day.

Like explorers of the past, the scientists of today need more than knowledge, skills, and a dream. That is why your tax-deductible contribution to the Sleep Research Society Foundation is so important. Your investment in the Sleep Research Society Foundation will help fund grants for scientists just beginning their journey or who need a little extra wind in their sails.

The discoveries of tomorrow depend upon the investments of today.

For more information on the Sleep Research Society Foundation and how you can contribute to tomorrow’s discoveries today, please visit www.sleepresearchsociety.org/foundation.
Discussion Group Synopsis: A Mock NIH Study Section Review

At the 2010 SLEEP Meeting in San Antonio the SRS Research Committee conducted a “mock” NIH Study Section session to help those submitting grants to NIH better understand the process by which these grants are reviewed. The motivation for this session, led by Dr. Kathryn Lee, was to help demystify the grant review process, in particular, to give attendees a sense of what actually happens in the room when the review occurs and how this can affect the outcome of the review. In order to achieve these aims, a group of individuals who have experience sitting on NIH review committees carried out a “mock” review of a grant proposal in front of the audience. The “mock” reviewers included: Dr. Lee, Dr. Andrew Krystal, Dr. Eric Nofzinger, and Dr. Mark Aloia. The “mock” review included many of the key aspects of the review process including an introduction and setting of the ground rules by the Chair of the study section, a determination of which grants would be discussed and which would be triaged, presentations of the grant by primary and secondary reviewers, discussion of the grant by the entire study section, and finally, the scoring of the grant. Following the “mock” review, the panel answered questions that attendees had about a wide range of aspects of the submission and review process including what happens after the review ends. From the many questions asked, it was clear that there is a great need to provide information about the process of NIH grant submission and review. It is hoped that this session decreased the anxiety about the NIH grant submission process for attendees and provided them with useful information that will facilitate the process of grant submission and increase their chances of success.

For those who could not attend this session, these resources are highly recommended:
Kushida, CA (Ed). (2010). A guide for developing, writing, & implementing scientific research grant proposals. Joint publication of the AASM and SRS

Links to popular videos describing the review process and a FAQ document are available on the NIH video page: http://www.csr.nih.gov/video/video.asp.

Andrew D. Krystal, MD, MS
Kathryn Lee, RN, PhD, FAAN, CBSM
The 15th Annual Trainee Symposia Series held at SLEEP 2010 was once again a great success and well attended, with 240 trainees registered for the event. Attendees' level of training ranged from undergraduates to postdoctoral fellows and medical residents, and represented a variety of disciplines such as neuroscience, clinical psychology, nursing, and physiology. The series offered trainees a unique opportunity to network with peers and leaders in the field of sleep research, as well as attend scientific and career development sessions.

The day began with an outstanding pair of talks by Drs. Mary Carskadon and Matthew Walker. In recognition of the SRS’s 50th Meeting Celebration, Dr. Carskadon brought both wit and nostalgia to a brief history of SRS’s Trainee Symposia Series, highlighting numerous trainees from the first few years that went on to become respected and productive sleep researchers. As Dr. Carskadon noted at the time, clearly the financial investment in Trainee Symposia Series has been well worthwhile. Dr. Walker followed with an extraordinarily well-received Keynote Address, “An Accidental Sleep Researcher with 5 Misguided Career Suggestions” that entertained as it educated. Highlights included a thoughtful and compelling segment on the value of teaching the next generation of sleep researchers and a short, yet hilarious movie (produced by some of Dr. Walker’s students at Berkeley) in which Lego people discussed the importance of sleep. This pair of inspiring talks by Drs. Carskadon and Walker set the stage for the rest of the day.

Trainees then attended a series of small workshops with topics ranging from career advice and CV development to sleep and synaptic plasticity and the central control of peripheral circadian oscillators. Thirty-three of the field’s leaders graciously volunteered their time to teach and interact with the trainees during these workshops.

During the lunch sessions, as with previous years, trainees were given the opportunity to present research to their peers and research leaders who moderated the sessions, all in a less formal setting than the main SLEEP meeting. The trainee audience then had the opportunity to ask questions and the trainee speakers received feedback on their presentation content, format, and style.

The Trainee Symposia Series ended with a reception and career development fair at which trainees were able to mingle with sleep research lab groups and faculty to discuss potential job and training opportunities. The trainees and established researchers alike clearly embraced this relaxed combination of networking and socializing, all while enjoying appetizers and drinks. Approximately 24 labs were represented at the career development fair, making for another highly successful event.

As in prior years, a number of trainees received travel support to take part in the Trainee Symposia Series and attend the SLEEP meeting. This year a total of 34 trainees received travel support based on the quality of their research abstracts submitted for presentation at SLEEP. The SRS also provided travel awards to 23 first-time attendees at this year’s meeting. Together these programs represent a valuable investment in the future of the SRS as students who receive these awards are likely to return to subsequent meetings, present abstracts and maintain their membership in the SRS.

As in previous years, the feedback from trainees was consistently and enthusiastically positive. Trainees highlighted the benefits of networking with leaders in the field in an informal setting, the interactive nature of the workshops, the invaluable career advice, and the generous bestowing of travel awards from SRS. Having personally read of all the evaluations, I was struck by how many trainees, when asked how to improve the event, responded that...
they would not change a thing! This was my 8th Trainee Symposia Series, and year after year, I would echo their praise for the experience—an investment in the growth and encouragement of trainees that is unrivaled among any of the other scientific conferences I have attended.

Acknowledgements

The Trainee Education Advisory Committee (TEAC) is instrumental in planning the Trainee Day Symposia Series. Thank you to the members of TEAC: Jennifer Martin, PhD (chair), Philip Gehman, PhD (vice chair), Ronald Harper, PhD, Lisa Meltzer, PhD, Allan Pack, MD, PhD, David Raizen, MD, PhD, Jonathan Wisor, PhD, Amy Wolfson, PhD, Sara Nowakowski, PhD, (Trainee Member-at-Large), Brant Hasler, PhD, (Trainee Member-at-Large Elect), and Janet Mullington, PhD, (Board Liaison). Furthermore, thank you to Nick Cekosh, Annie Walker-Bright, and Anna Quinlanilla for their indispensable administrative help. Thank you, too, to the members of the Trainee subcommittee who helped select the topics and speakers for the symposia, as well as assisting in organizing on the day of the event. The subcommittee was led by Sara Nowakowski, PhD (2009-2010 Trainee Member at Large), and other members included: Allison Brager, Adam Bramoweth, Tina Burke, Lauren Daniel, Janine Hall, Megan Ruiter, Jared Saletin, Justin Thomas, Jacob Williams, and Lora Wu.

We would also like to thank the faculty who volunteered their time to present at this years event. Thank you to Mary Carskadon, PhD, Matthew Walker, PhD, Craig Heller, PhD, Marcos Frank, PhD, Patricia Haynes, PhD, Eric Nofzinger, PhD, Nancy Wensing, PhD, Amy Wolfson, PhD, Michael Vitiello, PhD, Mark Aloia, PhD, Margaret Moline, PhD, Sean Drummond, PhD, Sonia Ancoli-Israel, PhD, Allison Harvey, PhD, Ronald Szymusiak, PhD, Tamar Shochat, DSC, Anne Germain, PhD, Michael Perlis, PhD, Michael Twery, PhD, Allan Pack, PhD, Derk-Jan Dijk, PhD, Frank Scheer, PhD, Ann Rogers, PhD, Donald Blilwise, PhD, Michael Bonnet, PhD, Rachel Manber, PhD, Gregory Belenky, MD, Jonathan Wisor, PhD, Michael Menaker, PhD, Cara Constance, PhD, Robert Stickgold, PhD, Hawley Montgomery-Downs, PhD, Kenneth Lichstein, PhD, Martica Hall, PhD, Namni Goel, PhD, Harvey Moldofsky, MD, Janet Mullington, PhD, Emmanuel Mignot, MD, PhD, Kristen Knutson, PhD, Thomas Kilduff, PhD, and Terri Weaver, PhD, RN

Brant P. Hasler, PhD
Trainee Member-At-Large

The slide set series developed by the SRS includes comprehensive slide sets based on the Basics of Sleep Guide. Ten, hour-long lectures in PowerPoint format have been crafted by internationally-recognized expert authors. This peer-reviewed slide set serves as a tool for a variety of audiences from advanced high school education programs and graduate students to PhD/MD professionals. With its supporting text and references in Notes pages, the slide set is easy to use whether you are an expert speaker or a beginner.

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James K. Walsh is Executive Director and Senior Scientist of the Sleep Medicine and Research Center at St. Luke’s Hospital in St. Louis, Visiting Professor in the Department of Psychiatry at Stanford University, and Adjunct Professor of Psychology at Saint Louis University. He also serves as Executive Director of the Academic Alliance for Sleep Research. Dr. Walsh received his doctorate in experimental psychology from Saint Louis University in 1978. Since 1975 Dr. Walsh has authored over one hundred-seventy scientific manuscripts and chapters. His primary research interests include insomnia, clinical pharmacology, shiftwork, and the relationship of sleep and behavior. He is an Associate Editor of Sleep. Dr. Walsh was a member of the Board of Directors of the American Academy of Sleep Medicine (AASM) from 1984 to 1993 (president, 1991-92) and the National Sleep Foundation (NSF) from 1997-2009 (chairman, 2001-5). He has served on the board of directors of the Sleep Research Society since 2005 (president, 2010-11). From 1994 to 1997 he was a member of the Sleep Disorders Research Advisory Board for the National Center for Sleep Disorders Research at the National Institutes of Health. Awards received include the AASM’s 1995 Nathaniel Kleitman Award for Distinguished Service, the Lewis University Alumni Achievement Award in Psychology in 1994, the AASM’s Senator Mark Hatfield Public Policy Award in 1998, and the NSF’s Lifetime Achievement Award in 2006.

Phyllis C. Zee, MD, PhD is Professor of Neurology, Neurobiology, and Physiology, and Director of the Sleep Disorders Center and the sleep medicine fellowship training program, at Northwestern University Feinberg School of Medicine. She is also Associate Director of the Center for Sleep and Circadian Biology at Northwestern University.

Dr. Zee’s research has focused on the effects of age on sleep and circadian rhythms, pathophysiology of circadian rhythm sleep disorders, and behavioral interventions to improve sleep and performance. In addition, current NIH sponsored research include studies that examine the relationship between sleep and sleep disorders with cardiometabolic risk and cognitive function, and the effects of age on the neural response to sleep loss.

Dr. Zee is a fellow of the American Academy of Sleep Medicine, fellow of the American Academy of Neurology, member of the American Neurological Association and the recipient of the NIH Sleep Academic Award. Dr. Zee is also Associate Editor for Sleep and has served on the editorial board or as a reviewer for over 30 journals. She is very active on national and international committees and panels. She has been a member of NIH study sections and several NIH Data Safety and Monitoring Boards. She is a member of the Board of Directors of the Sleep Research Society, as well as being the past Chair of the NIH Sleep Disorders Research Advisory Board.
Dr. Allan I. Pack is the founding director of the sleep center at the University of Pennsylvania and the independent division of clinical sleep medicine. Dr. Pack’s primary interest has been in obstructive sleep apnea and its consequences. He directed a Special Center of Research on sleep apnea from 1988 to 2008 when the program was sunset. Dr. Pack’s current research focuses on genomic/genetic approaches and includes studies in model systems (Drosophila and mice) with translation to humans. Dr. Pack has played a major role in training the next generation of investigators. He is currently principal investigator of a training grant for graduate students and another training grant for postdoctoral fellows. Dr. Pack is also principal investigator of a K12 award on genetic/genomic approaches. Dr. Pack has been very active and advocating for our field, including in the area of drowsy driving. Dr. Pack has published over 200 papers. Dr. Pack has received a number of awards including the Nathaniel Kleitman Distinguished Service Award and the William C. Dement Academic Achievement Award from the American Academy of Sleep Medicine and the Lifetime Achievement Award from the National Sleep Foundation. Dr. Pack served as a founding member of the advisory board for the National Center for Sleep Disorders Research and was involved in generation of the first research plan for this Center.

Brant P. Hasler, PhD, is a second-year Postdoctoral Fellow in the Translational Research Training in Sleep Medicine (T32) program at the University of Pittsburgh School of Medicine and is currently mentored by Drs. Anne Germain and Daniel Buysse. Dr. Hasler graduated with a PhD in clinical psychology from the University of Arizona where Dr. Richard Bootzin served as his advisor, and he completed his clinical psychology internship at Western Psychiatric Institute and Clinic in Pittsburgh. Dr. Hasler’s primary research interests focus on the role of circadian rhythms, including sleep, in the modulation of mood and motivation, both at the basic level and with respect to psychopathology. He is currently focused on how circadian disturbance may lead to risk for substance abuse via its effects on reward-related brain functioning. In addition to his research pursuits, Dr. Hasler has clinical responsibilities in Dr. Buysse’s Insomnia Clinic. As a member of the Sleep Research Society (SRS) for the past eight years, he has been an enthusiastic attendee at seven Trainee Days and eight SLEEP meetings and has received a number of awards from the SRS. Dr. Hasler is currently serving as SRS Trainee Member-At-Large.
The Institute of Medicine’s report *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem* recommended that academic health centers integrate sleep research and training into health sciences programs, as well as residency and fellowship programs. In 2009 a Presidential Task Force on Academic Sleep Centers was formed to provide input to the SRS Board of Directors regarding the current status of academic sleep centers and what opportunities and barriers may exist to the development of additional academic sleep centers. Members of the task force included Gregory Belenky, Daniel Buysse, Ronald Chervin, Carole Marcus, Emmanuel Mignot, Katherine Parker, Susan Redline, Timothy Roehrs, Phyllis Zee and Ruth Benca (chair). The committee felt that it would be important to first obtain information about the structure and operations of current academic sleep centers, to determine where there might be gaps or areas where SRS support might be most helpful to established and developing centers. Therefore, a survey was sent to directors of sleep centers at 38 institutions receiving a Clinical and Translational Science Award (CTSA) from the National Institutes of Health (NIH). Responses were received from 35 centers. The major findings are summarized below:

**Administrative structure of the sleep program:**

1. 17/35 described themselves as a medical school or university-based comprehensive center structure responsible for clinical, educational and research missions. The remaining were divisions within departments, subdivisions of pulmonary medicine divisions, or hospital-based programs.
2. Of 11 centers that were divisions within single departments, 7 were in Medicine and 4 in Neurology.
3. In 14 sites, there were at least 2 clinical sleep programs; most of these were separate adult and pediatric sleep centers.
4. Leadership structures were more diverse. In only 4 centers did the director report to the dean of the medical school, and in 6 centers the director reported to a department chair. Five were medical directors only who reported to the hospital, with no academic center director. Several directors reported to groups of chairs, and in at least 10 programs, leadership of the sleep program was shared by 2 or more individuals, often with different reporting lines.
5. Only 5 programs had the authority to recruit and appoint faculty.

**Fiscal management of sleep center:**

1. In 25 centers, the sleep clinic and laboratory were managed by the same entity or entities, either the hospital (11), department or division (9), university faculty practice group (7), or several departments (2). (In some cases, more than one entity was involved in management of the clinic and laboratory).
2. In 10 centers, different entities managed the laboratory and clinic; the most common combination was hospital management of the laboratory and university physician practice group management of the clinic.
3. Twelve centers had at least partial administrative control over grants, but in the majority of centers, grants were administered and submitted by the principal investigator’s university department.
4. Revenue for sleep centers was derived from various sources. Clinical professional revenues generated by sleep medicine specialists were reported as flowing through sleep centers in 26 cases, but only 19 sites reported laboratory technical revenue coming to the sleep center. Graduate Medical Education funds to support sleep medicine fellows were provided in 22 sites. Although 16 centers reported receiving direct costs from grant funding, only 7 received any funds from indirect costs. Only 14 centers received institutional support for their academic mission.

**Clinical structure of sleep program:**

1. 34/35 sites reported AASM accreditation of their clinical center.
2. Most centers appeared to be highly multidisciplinary, with many specialties clinically represented/practicing in the center; this does not include consultants working in other clinics. In rank order of frequency, represented departments included pulmonary (100%), neurology (94.4%), psychology (behavioral sleep medicine; 71.4%), psychiatry (65.7%), pediatrics (62.9%), dentistry and internal medicine tied (54.3% each), surgery (51.4%), nursing (31.4%), cardiology (17.1%), family medicine (8.6%).
3. For centers with pediatric programs, in 13/22 cases the pediatric and adult clinics were in separate places, and 9/22 sites had separate pediatric sleep laboratories.
4. Services provided in the sleep centers included outpatient consultation and management of adults with sleep disorders (35), laboratory-based polysomnography (35), behavioral treatment for adults (29), inpatient (in-hospital) sleep studies (26), outpatient consultation and management of children with sleep disorders (19), behavioral treatment for children (19), unattended home sleep studies (19), sleep medicine consults for hospitalized in-patients (6).

**Educational component of sleep program:**

1. In 27 cases, all educational activities related to sleep and sleep medicine for the institution were organized by the sleep center; in 8 cases, the sleep center had partial responsibility.
2. Teaching activities by the centers included lectures for the sleep medicine fellowship (33), Continuing Medical Education lectures and lectures for residency programs (29 each), medical school lectures on basic sleep mechanisms and clinical sleep disorders (27 each), undergraduate and graduate courses in neurobiology and physiology of sleep (14 each), and graduate courses on clinical aspects of sleep (12).

3. In cases where lectures were provided for specific residency programs, psychiatry was most common; neurology and internal medicine were also frequently named, but most other departments were either infrequent (including pediatrics, family medicine and otolaryngology) or not listed.

4. In addition to fellowship training (32 sites), 33 centers provided clinical rotations for residents and fellows in other disciplines, 23 provided elective rotations for medical students and 15 provided CME.

5. Research trainees of various types were reported by many centers, including clinical research fellows with MD degrees (28 sites), graduate students and post-doctoral fellows (16 sites), and undergraduate research trainees (8 sites).

6. Six centers reported having an NIH training grant for sleep. Three sites reported that training grant slots were potentially available on training grants not specifically designated for sleep.

**Research component of sleep program:**

1. Eighteen centers reported having ever had an NIH or National Science Foundation center grant of some type; in at least 2 cases, these were not active awards at the time of reporting.

2. Types of research funding held by sleep center investigators included NIH R01s (22 sites), private foundation awards (19 sites), investigator initiated industry support (17 sites), clinical trials supported by industry (15 sites), NIH K awards (14 sites), other NIH awards (11 sites), NIH center grants (7 sites), Department of Defense (5 sites), AASM or SRS awards (4 sites), NSF awards (1 site).

3. Twenty six centers reported being involved in multi-site studies with at least 2 other sites, whereas 1 center was involved with just 1 other site. The remaining centers were not involved in multi-site studies.

4. Multi-site studies included NIH funded grants (18 sites), industry-funded clinical trials only (8 sites), private foundation funded studies (2 sites).

5. Eight sites reported running a scoring center or data management site for multisite studies.

6. Some centers were actively involved in core facilities relating to bioinformatics (8), genomics (4), proteomics (2), or imaging (7).

7. Only 14 sites reported having a Sleep Core in their institution’s CTSA.

8. Specific CTSA funding was provided for sleep pilot projects (9 sites), research sleep studies (7 sites), or sleep data processing (4 sites).

9. Faculty from centers participated in activities such as NIH study sections (20 sites), other sleep grant review committees (21 sites), teaching national sleep medicine courses (25 sites), AASM board of directors (7 sites), SRS board of directors (9 sites), AASM or SRS committees (22 sites), boards of other professional or scientific societies (16 sites), journal editorial boards (24 sites).

10. Community or other public education lectures were sponsored by 29 centers, whereas 9 centers sponsored community screening for sleep disorders.

11. Twenty centers gave input to government, schools or other public institutions on sleep and sleep disorders.

The SRS Board of Directors will review the data from this survey and consider what opportunities may exist to foster further development of comprehensive academic sleep programs.
Direct evidence for wake-related increases and sleep-related decreases in synaptic strength in rodent cortex (Liu ZW et al. J Neurosci 2010;30:8671-75).

Growing evidence points to a link between sleep need and neuronal plasticity. For instance, sleep need increases after learning, and learning tasks that involve local brain regions lead to local changes in sleep intensity. Also, sleep consolidates memories, whereas sleep deprivation interferes with memory acquisition (Diekelmann and Born, 2010). However, why and how sleep may benefit the brain by modifying synapses remains unclear.

The hypothesis that we have been testing over the last several years is that a consequence of staying awake is a progressive increase in synaptic strength, as the awake brain adapts to an ever-changing environment mostly through synaptic potentiation. However, a progressive increase in synaptic strength is unsustainable, since stronger synapses consume more energy, occupy more space, require more supplies, and saturate the ability to learn. Thus, sleep may serve an essential function by promoting a homeostatic reduction in synaptic strength (Tononi and Cirelli, 2006). This hypothesis does not rule out that synaptic potentiation or depression can occur in specific neuronal circuits in any behavioral state, but suggests that, overall, synaptic strength is higher after wake than after sleep. We currently do not know whether net synaptic potentiation and depression across wake and sleep are activity-dependent processes, similar to those involved in Hebbian and non-Hebbian synaptic plasticity, and why these processes would not be balanced at all times within each behavioral state. Conceivably, during wake there could be a bias towards potentiation because i) animals interact with the environment and should form memories of important interactions; ii) neurons tend to signal important events by firing strongly; iii) strong signals percolate best through the brain if synapses between pre- and postsynaptic neurons are strengthened, rather than weakened; iv) wake is associated with high levels of acetylcholine and noradrenaline, which together favor potentiation (refs in Liu et al. 2010). How sleep would bring about a net decrease in synaptic strength remains unknown, but several mechanisms are possible: i) in mammals, during slow wave sleep neurons undergo repeated sequences of depolarization/synchronous firing (up state) and hyperpolarization/silence (down state) at ~1Hz, which may be conducive to synaptic depression; ii) during sleep the levels of noradrenaline, serotonin, hypocretin and histamine are low, which may also favor depression; iii) the expression of BDNF, whose presence prevents synaptic depression, is reduced in sleep (refs in Liu et al 2010). While the first mechanism may only apply to mammals, the last two or similar mechanisms may also occur in flies, although direct proof is still lacking.

The evidence in support of the synaptic homeostasis hypothesis is mainly correlational, and is based on indirect markers of synaptic strength assessed over large areas of the adult brain. For instance, we have found that in rats, the levels of AMPA receptors in cortical synaptoneurosomes decrease by ~40% after a few hours of sleep (Vyazovskiy et al., 2008). Electrophysiologically, we also found that both slope and amplitude of cortical evoked responses (classical in vivo indirect measures of synaptic strength) also decrease after sleep. Preliminary observations consistent with these rodent studies have been made in humans using transcranial magnetic stimulation and high-density EEG analysis (Bellina et al., 2008). Mean firing rates in the rat cerebral cortex also increase after wake and decrease after sleep, consistent with a net change in synaptic strength (Vyazovskiy et al., 2009), and the levels of glutamate in the rat cortical extrasynaptic space also increase progressively during wake and decrease during slow wave sleep (Dash et al., 2009). In line with these mammalian studies, in flies overall levels of several pre- and postsynaptic proteins are high after wake and low after sleep independent of time of day, the decrease of synaptic markers during sleep is progressive, and sleep appears necessary for their decline (Gilestro et al., 2009). Yet, the molecular changes that we found in rats and flies do not necessarily reflect functional changes, and the field potential changes we documented in mammals, as well as changes in mean firing rates, could be influenced by factors other than synaptic strength, for instance neuronal excitability.

In a recent study in collaboration with Dr. Xiao-Bing Gao at Yale we therefore tested the prediction of our hypothesis using a direct measure of synaptic efficacy. We measured the effects of sleep/wake on miniature excitatory postsynaptic currents (mEPSCs), because the analysis of mEPSCs amplitude and frequency is one of the best established methods to directly measure synaptic strength: changes in mEPSCs frequency are thought to result from modification of the presynaptic component of synaptic transmission, while amplitude changes indicate alterations in the postsynaptic component. We studied coronal cortical slices from the frontal cortex of rats (Figure), and compared mEPSCs after awake (at night) vs. sleep (during the day), after sleep vs. sleep deprivation (both during the day), and after sleep deprivation vs. recovery sleep (both during the day). In all cases we found increased frequency and amplitude of mEPSCs after wake and sleep deprivation as compared to sleep, and in another experiment we confirmed these results in sleep deprived mice compared to sleeping mice. Thus, it seems that, at least in the rat and mouse frontal cortex, synaptic efficacy increases after periods of wake and is restored to lower levels after periods of sleep, independent of time of day. Dr. Gao’s team previously showed that sleep deprivation potentiates glutamatergic synapses on hypocretin/orixin.
neurons in the hypothalamus (Rao et al., 2007), suggesting that changes in synaptic efficacy due to sleep/wake could be widespread. In future experiments we want to determine whether this is indeed the case by evaluating net changes in synaptic strength in other cortical areas and other cortical layers. Moreover, since it is during development that sleep is most abundant and the brain is most plastic, we want to determine whether changes in synaptic strength due to sleep/wake also occur in the young brain. We may find that mEPSCs increase with wake and decrease with sleep in both adult and young animals. It is possible, however, that during early development wake may be preferentially associated with synaptic pruning and decreased synaptic strength, and sleep with synaptogenesis and increased synaptic efficacy, in line with evidence suggesting that key receptors or molecules may have opposite effects in developing vs. adult animals.

Chiara Cirelli, MD, PhD and Giulio Tononi, MD, PhD

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References
SRS NATIONAL OFFICE HAS MOVED!

The SRS National Office completed its move to a new location in Suburban Chicago in June. Please note the new phone & fax numbers and mailing address below:
Sleep Research Society
2510 North Frontage Road
Darien, IL 60561
Phone: (630) 737-9702
Fax: (630) 737-9790

“CONVERSATIONS WITH OUR FOUNDERS” INTERVIEWS POSTED ON THE SRS WEBSITE

The SRS is proud to present a series of interviews with pioneers in the field of sleep research. The purpose of these interviews is to document the rich history of our field and to commemorate the 50th Anniversary of our organization. Several of these interviews were recorded at SLEEP 2010 in San Antonio, Texas, where we celebrated our 50th meeting.

Acknowledgements go to members of the 50th Anniversary Task Force, especially Martica Hall, PhD, Gina Poe, PhD, and Sonia Ancoli-Israel, PhD, Chair for spearheading the Conversations with Our Founders project.

The first two “Conversations” with Bill Dement, MD, PhD and Allan Rechtschaffen, PhD are now available for viewing on the SRS website.

Each month a new interview will be posted to the website...so stay tuned!

SRSF ANNOUNCES 2011 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.

Elliott D. Weitzman, MD, Research Grant
The Sleep Research Society Foundation Elliott D. Weitzman, MD, 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 new criteria for the Weitzman grant makes it similar to a NIH R21 grant.

Please note: Changes have been made to the application requirements/criteria for both the Gillin and Weitzman grants.

The submission deadline for applications is November 30, 2010. Visit the SRSF website at http://www.sleepresearchsociety.org/foundation for more information.

SUBMIT A LETTER OF INTENT FOR SLEEP 2011 SESSION PROPOSALS

The APSS Program Committee requests early submission of a brief letter of intent to submit proposals for postgraduate courses, symposia, discussion groups and clinical workshops for SLEEP 2011. Letters of intent are not required; however, they are valuable as the information provided enables the Program Committee to identify gaps in the scientific program that need to be filled. The deadline to submit Letters of Intent is October 15, 2010.

Go to: www.sleepmeeting.org/PDF/LetterofIntentTemplate.doc to download the letter of intent template.

SRS MEMBER MARK R. ROSEKIND, PHD, SWORN IN AS A MEMBER OF THE NATIONAL TRANSPORTATION SAFETY BOARD

On June 30, 2010 Mark R. Rosekind, PhD, a member of the SRS, was sworn in as a member of the National Transportation Safety Board (NTSB).

Dr. Rosekind is an internationally recognized fatigue expert who has conducted research and implemented programs in diverse settings, including all modes of transportation, healthcare, law enforcement, elite athlete and military groups.

Prior to joining the NTSB, Member Rosekind was President and Chief Scientist of Alertness Solutions, a scientific consulting firm in Cupertino, California that specializes in fatigue management. Before founding Alertness Solutions, he directed the Fatigue Countermeasures Program and was Chief of the Aviation Operations Branch in the Flight Management and Human Factors Division at the NASA Ames Research Center. Prior to his work at NASA, Member Rosekind was the Director of the Center for Human Sleep Research at the Stanford University Sleep Disorders and Research Center.

Member Rosekind is an internationally recognized fatigue expert who has conducted research and implemented programs in diverse settings, including all modes of transportation. He has published 150 scientific, technical, and industry papers and provided hundreds of presentations to operational, general, and scientific audiences. His contributions have been acknowledged through numerous honors and awards, including the NASA Exceptional Service Medal, six other NASA Group/Team Awards, two Flight Safety Foundation honors (Presidential Citation for Outstanding Safety Leadership,
Dr. Rosekind earned his B.A. with Honors at Stanford University, his PhD at Yale University, and completed a postdoctoral fellowship at the Brown University Medical School. His term as a Member of the NTSB expires December 31, 2014.

The SRS congratulates Dr. Rosekind on his appointment to the NTSB.

Printed Edition of Journal SLEEP Now Requires Separate Subscription

In the last emailed SRS Update, we ran a headline “Journal SLEEP Going Online Only in 2011” that may have confused some readers. Beginning in 2011 all SRS members will have online access to the SLEEP journal, but the paper copies will only be distributed to those who sign up for a separate subscription, which will cost $150 for one year. Note that this is only available to SRS Members in the 50 United States, due to the additional costs of mailing outside the U.S.

Members who wish to add a $150 print subscription to their membership must remit payment to the APSS no later than Nov. 1, 2010. Payment may be submitted online by logging in to your account on the SLEEP website or via mail/fax by downloading the SLEEP 2011 Individual Online + Print Subscription Form. Print access to the journal is pending APSS receipt of a minimum 1,000 print subscriptions by the Nov. 1, 2010, deadline. If this minimum requirement is not met, then all members who have submitted payment will be refunded and will continue to receive access to SLEEP online only. Questions about your SLEEP subscription can be directed to the APSS at subscriptions@aasmnet.org or 630-737-9700.

For more information on this matter please see the editorial in the September issue of SLEEP by Editor in Chief David F. Dinges, PhD, that explains this transition.

Post and Search Job Openings on the SRS Job Board

The SRS Job Board is a great resource for members to post job openings from their institutions and is a great way for members at all levels to find employment opportunities. The SRS Job Board can be accessed at http://www.sleepresearchsociety.org/JobOpp.aspx

Individuals interested in posting a position should provide the job or position title, description of duties and qualifications, and information about how to contact you. If you would like to post a job or have a questions about the Job Board please e-mail the SRS National Office.

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.

New SLEEP 2010 Online Poster Viewing Site

At the new SLEEP 2010 Online Poster Viewing Site, you can view and discuss 270 posters that were presented in June at SLEEP 2010, the 24th annual meeting of the Associated Professional Sleep Societies LLC (APSS). Each poster is viewable in PDF format, and a comments area allows for interactive discussion of the science.

Access to the online posters is FREE for SRS and American Academy of Sleep Medicine (AASM) members who attended SLEEP 2010. All others may purchase unlimited access to the site for $25. Register today to create your account and gain access to this great educational resource, then log in to enter the site. Posters will be available for online viewing until November 30, 2010.

Order Audio Downloads of Select SLEEP 2010 Sessions

New this year you can order audio downloads of up to 22 recorded sessions from SLEEP 2010, the 24th annual meeting of the Associated Professional Sleep Societies LLC (APSS), which took place June 5 – 9, 2010, in San Antonio, Texas. Each session recording includes the full session content in an MP3 audio file, as well as all presentations in PowerPoint or outline format (when applicable), allowing you to listen and learn at your own convenience.

After you place your order, an e-mail containing a link to your personal SLEEP 2010 audio library will be sent to you. Don’t miss out on some of the best sessions at SLEEP 2010 – order your audio downloads today! Individual sessions are $20 each, or you can order the 22-session, all-access library subscription for $350 – a savings of $90! View a complete listing of the 22 available audio recordings and place your order today by visiting the Intel-liQuest Media website.

How to Highlight Your Laboratory to the Rest of the Field

Email the Editor, Dr Helen Burgess at Helen_j_burgess@rush.edu to have your laboratory considered for a Domestic or International Laboratory Spotlight in the next issue of the SRS Bulletin.
Wake Up Doctor – The Public Joins the Resident Physician Work Hours Debate

The debate over resident physician work hours has raged for over thirty-five years, yet despite the safety implications for patients, that debate has taken place almost exclusively without the public’s input. One notable exception was the widely publicized case of 18-year old Libby Zion. Her death in 1984 sparked a public investigation and passage of the New York State “Bell Regulations” in 1989, which limit the number of hours physicians-in-training can work per week and per on-call shift.

Now – with the launch of www.wakeupdoctor.org – patient safety advocates are again raising concerns about the danger of scheduling residents to work 24 or more consecutive hours with little or no sleep multiple times a month. They have been able to draw on a wealth of sleep science research published in the intervening years, especially studies by the Harvard Work Hours Health and Safety Group which have focused on resident physician fatigue and clinical performance deficits.

Wake Up Doctor is a coalition of consumer and patient safety organizations led by Public Citizen and Mothers Against Medical Error (with support from the American Medical Student Association and the Committee of Interns and Residents). Their goal is to educate and organize the public to voice their support for implementation of Institute of Medicine recommendations to reduce resident work hours and workload and increase supervision (Resident Duty Hours: Enhancing Sleep, Supervision and Safety, National Academies of Science. 2008).

The first Wake Up Doctor petition began to circulate with the launch of the website on February 4. Sent to the Accreditation Council for Graduate Medical Education (ACGME) – the petition had more than 800 signatures, including some 40 consumer and patient safety organizations and leaders. It was timed to influence the ACGME’s deliberations over new resident work hours rules. One of those groups – the influential Consumers Union Safe Patient Project – went on to email blast their members in May and July with similar requests to the ACGME to act on the IOM’s recommendations. As a result, the accrediting body heard from an estimated 4,000 consumers.

The coalition has also publicized the results of a recent opinion survey that found the public underestimates by far the number of hours resident physicians work. Eighty-one percent believed patients should be informed if their resident physician had been working for 24 or more hours and 80 percent would then want a different doctor. (US public opinion regarding proposed limits on resident physician work hours, BMC-Medicine http://www.biomedcentral.com/1741-7015/8/33.)

Despite these obvious concerns on the part of the public, in late June the ACGME proposed new rules to go into effect July 1, 2011. While reducing on-call shifts for interns to no more than 16 consecutive hours, the new rules would still allow the vast majority of the nation’s resident physicians to work shifts of 28 consecutive hours with little or no sleep as often as every third night. Weekly work hour totals for both interns and resident would remain at 80 hours, and would continue to be averaged over four weeks. This would allow for single weeks of 100 hours or more.

Wakeupdoctor.org will continue to post updates and solicit feedback from both patients and residents as the new rules evolve.

Helen Haskell
Founder and President
Mothers Against Medical Error
Analytic and Modeling Unit

The Analytic and Modeling Unit (AMU) is located within Harvard Medical School’s Division of Sleep Medicine at Brigham & Women’s Hospital. Formed in 2000, the group originated with Dr. Kronauer’s mathematical modeling work, which influenced the early work of Dr. Emery Brown, Dr. Steven Strogatz, Dr. Megan Jewett and Dr. Elizabeth Klerman. The group has a strong history of integrating mathematical modeling with experimental research. This emphasis on multidisciplinary research is reflected in the diverse backgrounds of the group’s members, including graduates in medicine, mathematics, statistics, physics, engineering, and computing. Strong ties with experimentalists in the Division of Sleep Medicine have yielded a highly productive two-way dialogue, with experimental results improving model design and model predictions informing experimental protocols.

Research Interests

Members of the AMU systematically and mathematically explore many aspects of sleep and circadian rhythms. Our primary research goals are to: (1) develop new techniques for analyzing circadian rhythms, sleep, hormones, performance, alertness and other data, and (2) develop mathematical models of human circadian rhythms, sleep/wake cycles, hormones, performance and alertness. Members of the AMU collaborate with investigators within the Division of Sleep Medicine and from other Divisions to apply the principles of circadian rhythms research to the study of human physiology and pathophysiology. The results have implications for the design and analysis of future circadian experiments as well as reinterpretation of earlier studies. Recent projects have included:

1. Modeling the effects of different patterns of light exposure on observed circadian rhythms.
2. Reanalysis of data to demonstrate that a method of analysis frequently used in circadian rhythm research yields inaccurate results.
3. Analysis of three markers of the circadian system for sources of variability, providing quantitative assessment of their relative accuracy as markers of circadian rhythms.
4. Mathematical optimization of the use of light as a countermeasure to shift circadian rhythms to a new schedule while minimizing predicted performance deficits.
5. Extension of our validated mathematical model to include non-photic effects on the human circadian pacemaker.
6. Development of a physiologically based model of the daily growth hormone secretion pattern with Dr. Emery Brown of Massachusetts General Hospital and MIT.
8. Use of state-space techniques to study differences in sleep dynamics in normal animals and orexin-knockout animals.

Current Research

Current projects running within the AMU include:

1. Extension of a mathematical model of the human circadian pacemaker to include the effects of light exposures of different durations, intensities, and spectral properties.
2. Development of new techniques for quantifying sleep architecture and its changes with aging and after pharmacological intervention.
3. Integration of models of sleep/wake physiology and circadian rhythms to study the interactions between these systems.
4. Modeling human performance and alertness on hypothetical schedules, and incorporating the effects of pharmaceuticals.
5. Use of physiological models to determine the mechanisms underlying inter-individual and interspecies differences in sleep habits.
Quantification of short- and longer-term sleep homeostasis effects on sleep and performance.

**Training Opportunities**

We welcome undergraduate students, graduate students, fellows and faculty for short- and long-term projects. We welcome collaborations with individuals from within the BWH and from elsewhere.

**Representative Publications**

**Underlined names are trainees in the AMU**


### History

The Centre d’étude des troubles du sommeil (Sleep Research Center) was established in 1995 when Charles Morin joined the School of Psychology at Laval University after having completed his doctoral and post-doctoral training in the US and served on the faculty and as director of the sleep disorders center at Virginia Commonwealth University. Since then, several investigators have joined the Sleep Research Center and developed their own laboratory and research program. Currently, the center comprises three main laboratories including a sleep laboratory for polysomnography recordings, an electrophysiology laboratory for evoked potential studies (headed by Célyne Bastien), and a chronobiology laboratory (headed by Marc Hébert). In addition, collaborators Josée Savard and Annie Vallières, also professors at the School of Psychology, have established their own clinical sleep research programs.

### Current Research Program

The sleep research program at Laval University focuses predominantly on insomnia and involves three components – epidemiology, pathophysiology, and treatment development and translation. Its primary mission is to educate and train new investigators and clinicians and promote research to further our understanding of insomnia and its risk factors and develop cost-effective therapeutic approaches.

**Epidemiology.** The aim of this research component is to document the risk factors, natural history, and comorbidity of chronic insomnia. A longitudinal study (funded by the Canadian Institutes of Health Research) involving a cohort of 3000 adults (with and without insomnia) recruited throughout Canada is in progress since 2001 to address this objective. This study has documented the high prevalence of insomnia both as a symptom and a disorder, its persisting course over time, and identified potential risk factors (hyperarousal, familial history) as well as its economic burden. Future studies will seek to (a) identify critical factors moderating the course of insomnia, (b) validate insomnia phenotypes (e.g., idiopathic, paradoxical) and (c) document the medical (e.g., cardiovascular) and psychiatric (e.g., depression) morbidity associated with persistent insomnia.

**Etiology/pathophysiology.** Hyperarousal is recognized as a core feature of insomnia, but there is still much controversy whether it plays a direct etiological role or is merely an epiphenomenon of insomnia and whether it is best conceptualized as a state or trait feature. We have previously documented the role of hyperarousal in insomnia through investigations of psychological factors and the microstructure of sleep. Future studies will expand on this program through longitudinal studies of additional psychological factors and biomarkers of hyperarousal (e.g., heart rate variability and catecholamines). A related part of this program focuses on functional impairments associated with insomnia through neuropsychological
assessment of cognitive functions and use of a driving simulator to evaluate the daytime vigilance and the risks of road accidents due to fatigue/sleepiness.

**Treatment development and dissemination.** The third component of our research program aims to develop, validate, and disseminate cost-effective interventions for the management of insomnia. Our group has conducted several randomized clinical trials documenting the efficacy of cognitive-behavioral therapy (CBT) for both primary insomnia and insomnia comorbid with medical (cancer, traumatic brain injury) and psychiatric disorders (anxiety). Despite strong evidence of efficacy, CBT is not readily available and remains underutilized in clinical practice. A critical issue that we are currently addressing is the transportability / dissemination of CBT to both patients and health care practitioners. The feasibility and efficacy of new treatment delivery methods (self-help, stepped-care approach) is of critical importance to our research program.

**Collaborations**

Research collaborations involve colleagues from Laval, as well as from other universities in Canada, in the US and in Europe. Ongoing research collaborations with colleagues at Laval are with professors Josée Savard on insomnia and cancer, with Célyne Bastien on cortical activation, evoked potentials, and information processing during sleep, with Annie Vallières on the application of behavioral interventions for shift work sleep disorders, and with Marie-Christine Ouellet on the treatment of sleep disturbances and fatigue associated with traumatic brain injuries. Another collaboration with investigators from the University of Montréal (Lanfranchi, Montplaisir) addresses the relationship between insomnia and heart rate variability. International collaborations (funded through NIMH) are with Alison Harvey (U. California, Berkeley) on a dismantling study of CBT for insomnia and with Lee Ritterband (U. of Virginia) on the feasibility and efficacy of internet use for treating insomnia. This network of collaborators provides some unique opportunities for trainees and investigators to share expertise and databases across sleep laboratories.

**Facilities and Technical Capabilities**

The Laval University sleep research program is housed at two separate locations. The sleep lab facilities are located off-campus at the Centre de recherche Université Laval-Robert Giffard, which is part of the Institut Universitaire en Santé Mentale de Québec. All direct contacts involving evaluation (PSG and clinical) and treatment of study participants take place at that location. All research management activities involving scheduling of study participants, data management, and team meetings take place at the on-campus site, housed within the School of Psychology.

We have state-of-the art equipment including five, 32-channel Grass polygraphs, four, 16-channel Vitaport systems for ambulatory recording, a driving simulator (STISIM – Drive 400), and a neurobehavioral assessment battery. The sleep laboratory occupies more than 5,000 square feet and comprises five recording bedrooms and several working stations for lab technicians and offices for consultation and working space for graduate students and fellows. The on-campus component offers additional workstations and offices for data management and other research-related activities led by assistants, students, and fellows. The Sleep Research Center is entirely funded by research grants and contracts.

**Training Opportunities**

Our center offers training opportunities for technologies, undergraduate students completing their Honor’s Thesis, and PhD students enrolled in our psychology doctoral programs at Laval. We also receive post doctoral fellows from Canada and from around the world (recent fellows from China and Spain) for advanced research training in behavioral sleep medicine.

**Representative Publications**


**SRS Bulletin**


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**
- Charles J. Bae, MD, FAASM  Cleveland Clinic Sleep Disorders Center, Cleveland, OH
- David M. Baratz, MD, FAASM  Phoenix, AZ
- James C. Byrd, MD  University of Florida, College of Medicine, Gainesville, FL
- Denise Troy Curry, MD  Saint Luke’s Hospital, Chesterfield, MO
- Christopher Ehlen, PhD  Morehouse School of Medicine, Atlanta, GA
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- Annette Fedson  University of Western Australia, Perth, WA, Australia
- Ashley Kick  Northwestern University, Chicago, IL
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