Issue Highlights:

• APSS Keynote Address:
  Dr. Allan Hobson

• Interview with the Editor:
  Richard Bootzin, Ph.D.

• National Sleep Awareness Round Table Update
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Editors: Charles J. Amlaner, DPhil and Orfeu M. Buxton, PhD

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Normal Human Sleep at Different Ages: Sleep in the Older Adult (Ancoli-Israel)

Set 2 - Sleep Deprivation / Restriction:
Animal Models (Eversen)
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Set 5 - Sleep Physiology:
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Set 6 - Sleep Physiology:
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Sleep and the Autonomic Nervous System (Caples, Lanfranchi, and Somers)
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Dear Colleagues,

Welcome back from what I sincerely hope were productive times at SLEEP 2008 in Baltimore and enjoyable summer vacations! This is the first of several “President’s Messages” that you will receive from me over the coming year. Let me begin by thanking the members of the Society for their vote of confidence in me. I am honored and humbled by my election and I will do my utmost to ensure that the Sleep Research Society is an even stronger and more vibrant organization at the end of my presidential year.

I hope to accomplish this by continuing to build on the excellent foundation created by previous SRS Presidents and Boards of Directors, seizing opportunities to advance the mission of the SRS as they occur, and strengthening our continuing relationship with our sister society, the American Academy of Sleep Medicine.

I think it fitting to briefly review the activities of last year, both to recognize the significant efforts of so many of your fellow SRS members and to give you a sense of the breadth and depth of the many activities in which the Society is currently engaged. Key in the recent success of these activities was the sure hand of my predecessor, Past-President, Dr. Eric Nofzinger, who ably guided the Society in initiating the strategic plan that the SRS Board of Directors and, then President, Dr. Mark Opp developed in 2007. The SRS Strategic Plan can be found at this web link http://www.sleepresearchsociety.org/Policies.aspx.

Here is a partial listing of the Society's activities over the past year:

• At SLEEP 2008 the SRS recognized society members for their professional achievements: Dr. Charles Czeisler, Distinguished Scientist Award; Drs. Robert Y. Moore, Friedrich K. Stephan, and Irving Zucker, Outstanding Scientific Achievement Award; Dr. Richard Bootzin, Mary Carskadon Outstanding Educator Award; Dr. Thomas Penzel, Bill Gruen Award; Drs. Antoine Adamantidis, Esra Tasali, and Vladyslav Vyazovskiy, Young Investigator Award; and Dr. David Raizen, Young Investigator Honorable Mention Award.

• At SLEEP 2008 the SRS together with the AASM hosted the 6th Annual Discovering the Secrets of Sleep Fundraising Dinner. Profits from the dinner were equally divided between the SRSF and the ASMF. In addition, the 2008 SRS Gillin Award and Sleep Fellowship winners were announced at the dinner. Drs. Nancy Johnston, Anna Kalinchuk, Mirjam Munch, and Yuka Sasaki received the 2008 J. Christian Gillin, MD Award. Dr. Natalia Tulina received the 2008 SRS Sleep Fellowship Award, a new award program intended to support members of the SRS who are currently engaged in active post-graduate sleep research in a recognized sleep research laboratory, or in an ACGME-accredited sleep fellowship program.

• The SRS hosted another successful Trainee Day at SLEEP 2008. Trainee Day was attended by 230 trainees, 65 of whom were supported by SRS merit-based and first-time Trainee Travel Awards.

• In the context of the SRS strategic plan, the SRS Presidential Task Force on Research Funding, chaired by Dr. Terri Weaver, tackled the job of defining mechanisms by which the SRS can benefit our members by promoting funding for sleep research at all levels and for increasing awareness of funding opportunities to members of the SRS. Two important initiatives were advanced due to the efforts of this Task Force. First, the SRS hired Nick Cekosh, a full time SRS staff person, whose primary responsibilities are research funding advocacy and increasing the awareness of sleep research funding among SRS members. Second, the SRS made a research funding opportunity database available to all its members. This search engine is a Members Only benefit that can be found as the first item on the front page of the SRS web site www.sleepresearchsociety.org/ entitled “New Research Funding Database Available to SRS Members”.

• In addressing another component of the SRS strategic plan, the SRS Presidential Task Force on Public Health, lead by Dr. Allan Pack, reviewed areas of sleep research that have direct implications for public health and is developing an SRS public policy statement on the topic of “Drowsy Driving.”

• A third task force, the SRS Presidential Task Force on Academic Sleep Centers, chaired by Dr. Ruth Benca, is developing a questionnaire to assess the current state of academic sleep centers nation-wide, a first step in determining how the SRS can facilitate its growth.

• The SRS Educational Programs Committee, chaired by Dr. Charles Amlaner, developed single slide sets based on the 1.1 version of the Basics of Sleep slide set series. These new single slide sets can now be ordered at the SRS website at this link http://www.sleepresearchsociety.org/News.aspx?id=1005.

• The SRS hosted a two-day course, co-chaired by Drs. Thomas Kilduff and Thomas Roth, entitled, “The Development of Sleep Promoting Agents.” This course provided an in-depth overview of the nature of insomnia, current pharmacological treatments and identification of targets for future drug development. The course was a great success with 77 individuals in attendance. All profits from the course went directly to the Sleep Research Society Foundation.
• The Educational Programs Committee also successfully began to present “webinars,” 60-minute educational events over the internet, to reach broad audiences in key topics of sleep research. Two successful webinars have been given: Dr. Ron Szymusiak on “Mechanisms of Sleep and Arousal Regulation;” and Dr. Clifford Saper on “Hypothalamic Regulation of Sleep and Circadian Rhythms.” Three more webinars are planned for later this year with scheduled speakers; Drs. Eve Van Cauter, Charles Czeisler and Fred Turek. Webinars will be announced to the membership in the SRS Update.

I trust you will agree that these recent Society activities represent an impressive collection of service to our membership and our field of research.

Many of the Society activities described above are on-going and it will be my responsibility to ensure their continued success over the coming year. In addition, there are also several new initiatives that will be shaping up during my presidency. They include the formation of two new SRS Presidential Task Forces; one on Genetics and Sleep, chaired by Dr. Allan Pack, and one for the 50th Anniversary of the SRS, chaired by Dr. Sonia Ancoli-Israel. You will hear much more about these and many other Society activities over the coming months in future President’s Messages, feature articles in the SRS Bulletin, and announcements in SRS Update.

I close with a reminder that any society is only as strong as the collective contributions of its membership. The “sweat equity” of many SRS members is what so successfully fuels the activities of the Society’s Executive Committee, Board of Directors, standing committees, presidential task forces, and course committees. Without enthusiastic, dedicated and capable member volunteers, all SRS activities would grind to a screeching halt. So, if you believe the SRS is providing good service to its membership and would like to be a part of this worthy effort, then please get involved in Society activities and help provide even better service to your fellows. And, should you believe the SRS is not doing enough for its members, or doing things wrong, then I say to you too, get involved, and let your sweat equity help ensure our Society is a responsive, successful, and growing organization.

Wishing you all a productive year,

Michael V. Vitiello, PhD
President, Sleep Research Society
Dreaming is not an unconscious mental state. While it exists, it is conscious but it is forgotten. Dream consciousness has important similarities to and differences from waking consciousness.

The similarities include a sense of self-as-agent, agent initiated movement, sensation, and emotion all of which are integrated. These similarities are attributable to activation (A) and suggest the early and persistent instantiation of a program for conscious experience that I propose to call “proto-consciousness.”

The differences are equally striking. They include: internally generated imagery (or hallucinosis), the erroneous but interesting conviction that the dreamer is awake (delusion), distinctive cognitive features (dream bizarreness), strong emotion (anxiety, anger, and elation) and amnesia (dream forgetting). The extensive evidence for these formal dream features is summarized in the Table below:

As the input-output gates close, internal stimuli are generated.

| Dream Consciousness Empirical Studies from the Laboratory of Neurophysiology |
|---|---|---|
| Perception 1981 | Nightcap Study 2001 | Thinking 2005 |
| Movement 1986 | Memory Source 2003 | Schizophrenia 2008 |
| Children 1991 | Gender 2004 | Logical Inference 2008 |
| Emotion 1991 | | |
| Plot Sequence 1994 | | |
| Dream Splicing 1994 | | |

Three features in REM sleep dream generation are thus activation (A), input-output gating (I), and modulation (M). The physiological basis of all three factors is well understood and is summarized below:
The mode of information processing (M) is set by aminergic/cholinergic modulation.

The three factors A, I, and M can be used to construct the 3-D model shown below. In the AIM model, time is the fourth dimension and a night of sleep can be represented as 4 elliptical trajectories through the state space. As well as explaining the cardinal states of waking, sleeping and dreaming, abnormal states like narcolepsy and exceptional states like lucid dreaming can be represented and understood via the model. It turns out that lucid dreaming is associated with increased activation as predicted by the model (Voss et al., 2008).

A remarkable feature of REM sleep dreaming, previously attributed to “development” without specification, is its dramatic plasticity over a lifetime. Something like REM sleep is abundantly present at 30 weeks of gestation. After birth, it declines, at first rapidly and later gradually, as humans evolve from infancy (when they sleep 16 hours a day) through childhood and adolescence (when they still sleep a lot) to adulthood, middle and old age, when many complain of not sleeping enough. Consciousness develops and declines in parallel with this time course.

I suggest a new theory, which holds that REM sleep dreaming is specifically devoted to the instantiation and development of consciousness. According to this theory, REM sleep is a state of proto-consciousness which owes its origin to the genetic specification of addresses and chemical identities of neurones. The aminergic and cholinergic neurones of the brain stem then interact so as to partition the organism’s time first as REM, then as non-REM, and only much later as waking.

The ontogenetic predominance of REM sleep gives the organism a head start in the prolonged task of developing consciousness. By means of REM, the problem of binding self-agency, agent mediated movement, sensation, and emotion is automatically solved. A necessarily limited set of genetic instructions is converted by self-organization to an activation program that thereafter interacts with the environment to develop the specific data that become a part of consciousness over time. Content is added during each waking period and integrated with the automatic program of dream consciousness each night. This aspect of the new theory is compatible with evidence for the consolidation of daytime learning by nocturnal sleep.

In summary, I propose that REM-sleep dreaming is a proto-conscious state which forms the substrate, basis, and scaffold for waking consciousness. REM sleep dreaming is neither unconscious nor antagonistic to waking consciousness. Rather it is a built-in primordium, or model, upon which waking consciousness is built.

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Dr. Hobson’s research has been supported by grants from the NIH, NSF, and the John D. and Catherine T. MacArthur Foundation.

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Dr. Hobson’s research has been supported by grants from the NIH, NSF, and the John D. and Catherine T. MacArthur Foundation.
The 13th Annual Trainee Day Symposia series held at SLEEP 2008 was well attended again this year with over 240 trainees registered for the event. The series offered trainees an 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 excellent Keynote address by Drs. Allan Pack and Fred Turek titled “The Genetics/Genomics Revolution: What Does it Mean for the Future of Sleep Research?” This inspiring and paradigm-challenging address set the stage for the rest of the symposia.

Trainees then attended a series of small workshops with topics ranging from career advice to the application of genetics in sleep research. Thirty-four of the field’s leaders volunteered their time to teach and interact with trainees.

As with previous years, trainees were given the opportunity to present their research to their peers and to research leaders who were moderating the session. Two new lunch sessions were added this year, the first of which welcomed first-time attendees to Trainee Day and SLEEP 2008 and a second session, which encouraged trainees to become involved in the Sleep Research Society.

Trainee Day ended with a career development fair at which trainees mingled with lab groups and heads of labs and were able to 'fact find' about job opportunities.

The feedback from trainees regarding all aspects of Trainee Day was a resounding sense of positive engagement, highlighting how enjoyable and beneficial the Day's experiences are for sleep trainees.

Acknowledgments

The Trainee Education Advisory Committee (TEAC) is instrumental in the planning of the Trainee Day Symposia Series. Thank you to the members of the TEAC committee: Jennifer Martin, Ph.D. (chair), Philip Gehrman, Ph.D. (vice-chair), Celyne Bastien, Ph.D., Jason Ellis, Ph.D., Ronald Harper, Ph.D., Allan Pack, Ph.D. MBChB, Amy Wolfson, Ph.D., Tracy Rupp, Ph.D. (Trainee Member-at-Large), and James Walsh, Ph.D. (Board Liaison). Furthermore, thank you to John Slater, Annie Walker-Bright, and Anna Quintanilla for their administrative support. Thank you to members of the Trainee Day subcommittee who helped select the topics and speakers for the symposia. The trainee day subcommittee was lead by Tracy Rupp, PhD and the other members included: Daniel Bushey, Kris Singletary, Sara Nowakowski, Mark Smith, AJ Schwichtenberg, Jessica Massicotte-Marquez, Erin Koffel, Brandy Roane, and Simon Kyle. Finally, thank you to all the speakers and workshop leaders who volunteered their time.

Hospitality Suite

As always, the hospitality suite was a huge hit. The feedback from trainees was uniformly positive and they were grateful to have a central location for much-needed snacks and to rendezvous with other trainees during SLEEP 2008.

Eliza Van Reen, Ph.D.
Trainee Member at Large
DISTINGUISHED SCIENTIST AWARD

The Distinguished Scientist Award is the highest award presented by the Sleep Research Society. Awarded annually since 1989, it is given for significant, original and sustained contributions of a basic, clinical or theoretical nature.

Charles A. Czeisler, PhD, MD, is Baldino Professor of Sleep Medicine and the Director of the Division of Sleep Medicine at Harvard Medical School; and is an Affiliate Faculty Member in the Neuroscience Program at Harvard Medical School and the Health Science and Technology Program at Harvard Medical School/Massachusetts Institute of Technology. He is also Chief, Division of Sleep Medicine, Department of Medicine at the Brigham and Women’s Hospital in Boston, Massachusetts.

Dr. Czeisler received his PhD in Neuro- and Bio-behavioral Sciences and his MD from Stanford University. Throughout his illustrious career, Dr. Czeisler has been recognized for his academic and professional works and achievements by several organizational, governmental and private groups. He is a past President of the Sleep Research Society where he chaired the Presidential Task Force on Sleep and Public Policy, a Fellow of the American Society for Clinical Investigation and of the Association of American Physicians, is a Diplomate of the American Board of Sleep Medicine and a Fellow of the Royal College of Physicians (London).

Dr. Czeisler has more than 30 years’ experience in the field of basic and applied research on the physiology of the human circadian timing system and its relationship to the sleep-wake cycle. He is Team Leader of the Human Performance Factors, Sleep and Chronobiology Team of NASA’s National Space Biomedical Research Institute, which is responsible for developing sleep-wake schedule guidelines and related countermeasures for use by NASA astronauts and mission control personnel during space exploration. Dr. Czeisler has served on and consulted to a number of national and international advisory committees, including the National Institutes of Health, the Institute of Medicine, the National Academy of Sciences, the Sleep Research Society, the Nuclear Regulatory Commission, the Air Force Office of Scientific Research and the Air Transport Association. Dr. Czeisler has published over 120 original reports in peer-reviewed journals, more than 75 review articles, 5 books/monographs and numerous research abstracts; he has been a member of the editorial boards of American Journal of Medicine, Journal of Biological Rhythms, and Sleep, and is a widely-regarded speaker.

OUTSTANDING SCIENTIFIC ACHIEVEMENT AWARD

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

This year, the Sleep Research Society is acknowledging the discovery of the SCN as circadian pacemaker, which the SRS Board felt was seminal in launching the field of circadian rhythms research. Three individuals who played a key part in this discovery were recognized: Robert Y. Moore, MD, PhD, Friedrich Stephan, PhD and Irving Zucker, PhD.

Robert Y. Moore, MD, PhD, is a professor of neurology and neuroscience at the University of Pittsburgh, where he is also director of the Huntington Disease Clinic. Dr. Moore has an extensive teaching background, holds memberships in various professional and scientific societies, received many acknowledgements for his work, and was appointed by President George W. Bush to serve on the Committee of the National Medal of Science. His research has been on the organization, function and pathology of brain monoamine neuron systems and on the neurobiology of sleep and circadian function. Dr. Moore has served on a number of National Institutes of Health, Veterans Administration, and National Science Foundation committees and 15 editorial boards. He received a MD and a PhD in biopsychology from the University of Chicago, where he...
completed a residency in neurology and a fellowship in biopsychology; he completed an internship in neurology at University Hospital in Ann Arbor, Michigan.

Friedrich K. Stephan, PhD, is a professor of psychology at Florida State University, where he has taught and mentored students for a number of years and served on various committees. His research interests include the neural and hormonal control of biological rhythms in mammals, the biological clock gene expression, and the neural and hormonal control of reproductive behavior. Dr. Stephan has a variety of editorial duties, and his research has been featured in several journals and at scientific meetings. He received a PhD in psychology at the University of California, Berkeley.

Irving Zucker, PhD, is a professor of psychology and integrative biology at the University of California, Berkeley. His research is concerned primarily with neuroendocrine substrates that underlie rhythms in behavior and physiology of several species of rodents. Dr. Zucker is a member of numerous societies, has served on a number of editorial advisory boards, and has been publicly recognized for his work. He received a PhD in biopsychology from the University of Chicago, and was a postdoctoral fellow in behavioral endocrinology at the Oregon Regional Primate Research Center.

Mary A. Carskadon Outstanding Educator Award

The Outstanding Educator Award, established in 2005, is presented on an annual basis to honor excellence in the field of education related to sleep medicine and research.

Richard R. Bootzin, PhD, is professor of psychology and psychiatry at the University of Arizona, and director of its insomnia clinic. One of the pioneers of behavioral treatments for insomnia, Dr. Bootzin developed stimulus control instructions for insomnia, which remains one of the most effective single treatments for insomnia, receiving the highest standard-of-practice rating from the American Academy of Sleep Medicine. His research interests include the understanding and treatment of insomnia and sleep disturbance, sleep and cognition, and conceptual and methodological issues involved in developing effective psychological interventions. Dr. Bootzin has authored or edited twelve books and more than 175 articles and chapters that have influenced a generation of students. He has served on workshops and advisory committees, is an active leader in professional societies, and has held a number of elected offices, including a past member of the board of directors of the Sleep Research Society. He received a PhD in psychology from Purdue University.
**Bill Gruen Award**

Awarded annually since 2006, the Bill Gruen Award recognizes the highest-rated abstract in the instrumentation category. The award was established in memory of Bill Gruen, founder of Ambulatory Monitoring, Inc., in recognition of his many contributions to the sleep field.

Thomas Penzel, PhD, is research director of the sleep center at Charité University Hospital in Berlin. His research interest is the pathophysiology of disordered breathing during sleep and the development of diagnostic tools for sleep disorders. Dr. Penzel has held a number of national and international committee assignments, including the Sleep Research Society’s web and communication committee, the American Academy of Sleep Medicine’s (AASM) committee on the revision of sleep scoring rules, and chair of the AASM task force on digital and technical requirements. Dr. Penzel sits on the editorial board of the Journal of Clinical Sleep Medicine and other publications, has published more than 130 papers in national and international peer-reviewed journals, and co-edited seven books. He received a PhD, and then his habilitation, in physiology from Philipps University in Marburg, Germany.

**Young Investigator Award**

The Young Investigator Award recognizes outstanding research efforts by new investigators in the field of sleep research.

Young Investigator Award

Antoine Adamantidis, PhD, Stanford University

Esha Tasali, MD, University of Chicago

Vladyslav Vyazovskiy, PhD, University of Wisconsin

Young Investigator Honorable Mention

David M. Raizen, MD, PhD, University of Pennsylvania
Interview with the Editor:
Richard Bootzin, Ph.D.

Editor: Congratulations on winning the Mary Carskadon Outstanding Educator Award this year. What does it mean to you to win this award?

DB: I feel very honored to have received this award, and am particularly pleased to have received it from the Sleep Research Society. I have always admired the large proportion of resources the society dedicates to supporting trainees and their development.

Editor: The award honors an individual’s outstanding effort in disseminating basic and/or clinical sleep research as a mentor, teacher, or through public education. Can you talk a bit about how you got interested in teaching and why you decided to make it a significant focus throughout your career?

DB: I have always enjoyed teaching, but never made a decision to make teaching a significant focus in contrast to research or clinical activities. For me, these activities are intertwined. For example, the very best invited addresses or the very best theoretical papers are ones in which the speaker or author teaches us what is exciting and challenging about the topic and provides the details of methods and results to expand our knowledge. Teaching is part and parcel of all that we do.

Editor: What have you found to be the most rewarding aspects of teaching and mentoring students in sleep? What are some of the challenges that you have faced?

DB: Without question, the most rewarding experiences are to be engaged together in an exciting enterprise to advance knowledge. In that respect, the award is shared with the students, trainees and junior faculty who I have worked with and learned from. As I mentioned at the convention, if it weren’t for their successes, there would be nothing to celebrate.

As for challenges, I don’t see mentoring as a series of challenges. Instead I see a series of opportunities. Sleep is so interrelated with optimal functioning that it could be considered a “hub” science. Sleep is transdiagnostic because it predicts development of depression, anxiety, substance abuse, attention deficit disorder. Sleep affects learning, cognition, emotion regulation, social interaction, and health. And, there are rapid advances in sleep genetics and neuroimaging of sleep and its consequences. How could it not be exciting to be involved in advancing knowledge about sleep, honing our methods of treatment, and influencing public policy about the role of sleep?

Editor: In your view, what are some of the qualities that are critical to being an outstanding teacher and mentor?

DB: I doubt that there are a single set of qualities to being a good teacher or mentor and if there are, I make no claims to having them. In my experience, it is the interaction among colleagues, whether students or peers, that creates an exciting, productive environment. I advocate the junior colleague model of education because it fosters an environment that stimulates the advancement of knowledge.

Editor: Can you talk about some of the teachers/mentors who influenced your career along the way?

DB: When I think about who I was most influenced by, the main commonality they share is that they are individuals who loved intellectual and creative challenges. I’d like to acknowledge the debt I have to four in particular.

First is Tom Natsoulas who was a new assistant professor in the psychology department at the University of Wisconsin when I was an undergrad. Tom was the instructor for a laboratory seminar in perception. He required each student to design an experiment on a topic of our choosing from the syllabus and carry out the study. The topic I selected was perceptual defense. Besides meeting during the scheduled class hours for lectures about perception, we met on Saturday mornings to work on our experiments. The course experience did not end with the running of subjects. Tom and one of his graduate students helped with the statistical analyses, and Tom guided the write-up of the study which was accepted and published in the Journal of Personality and Social Psychology. The experience of being treated as a junior colleague engaged in cutting-edge psychological science was exciting and inspiring. It influenced me to apply to graduate school in psychology. Tom’s view was that the seminar experiments were to be real science, not illustrations of science for course credit. It was a lesson in teaching that I have tried to emulate.

Second, Mark W. Stephens was my major professor in clinical psychology at Purdue University. From Mark, I learned the power of conceptualizing personality, psychopathology, and treatment from a social learning perspective. Mark’s major professor had been Julian Rotter who along with George Kelly produced many of the prominent academic clinical psychology researchers of the 1950s and 1960s. Mark’s mentorship provided an introduction to the network of psychological clinical scientists influenced by Rotter and Kelly. Mark provided practical mentoring, too. He had been editor of his college newspaper and patiently provided feedback on writing and editing on manuscripts. Mark taught me how to think and write about science more clearly.

Third was Joe McDonough. I sought a clinical psychology internship with a behavioral treatment focus. I was accepted by the Palo Alto VA, administered a token economy for an inpatient medication research ward in Menlo Park, and Joe was my supervisor. Joe had a behavior-analytic perspective which he applied to vocational rehabilitation. He was dissatisfied with the “sheltered” aspect of the typical vocation rehab of the day and sought to create work experiences that would allow patients to be employed in the community. In Joe’s view, the best way to do this was to create businesses that would be staffed with chronic mental patients. There was a patient-run gas station and a patient-run housing rehab business. Joe was persistent and fearless in following through on his conviction that mental patients could be given responsibility despite their symptoms. What I remember and admire most about Joe was his capacity to implement new creative opportunities for patients, no mean feat when confronted with the bureaucracy of the VA. I hope that I have just a bit of Joe’s creativity and tenacity.

Fourth, Lee Sechrest was the director of the clinical psychology program when I was hired as an assistant professor of psychology.
at Northwestern University. Eighteen years later, Lee was head of the psychology department at the University of Arizona, and he hired me a second time. It’s not really that I’ll follow Lee anywhere. I do, however, admire him enormously for his unflinching critiques of the methodology of science, his creativity in seeking methodological solutions, his interest in everything, and his compassion for everyone, not least of all, his students. The 1970s at Northwestern was one of the special times in academia when many in a particular place and time collaborated on common problems, influenced each other, and become a magnet for visitors from around the world. The focus on methodology and the contributions of Don Campbell, Ben Underwood, Lee Sechrest, Bob Boruch, Tom Cook, Dave Cordray, Paul Wortman, Ken Howard, Bill Revelle, and Al Erlebacher among others, produced just that kind of magical environment. I feel very fortunate to have been part of it.

You’ll notice that none of those I mentioned were sleep researchers. My interest in sleep was a happy accident in which a student at Northwestern, asked me if I knew of anything that might help her husband who had a life-long problem with insomnia. That question led to my developing stimulus control instructions for insomnia and a fulfilling career in sleep. Much of what I have learned has been influenced by interactions with sleep colleagues, both senior and junior.

Editor: What do you think are some of the public education priorities that we should focus on as a field?

DB: As I mentioned earlier, sleep is a hub science, and, thus, it is not the prerogative or responsibility of any single discipline or profession. We need to maintain the interdisciplinary nature of sleep research at the forefront of our public education efforts. Further, application and treatment, including training of clinicians, must be supported by scientific evidence. Accreditation of training should keep knowledge of our scientific base as a high priority.

Editor: You have mentored several people who went on to choose sleep for their career. How have you been successful at making sleep such an attractive career choice?

DB: I believe that the strongest influence in making a career choice is whether the activities are intellectually exciting and personally satisfying. I’m delighted that so many of those who were my students and trainees have chosen sleep as their career, but I don’t claim credit for it. To paraphrase, Hillary Clinton’s comment that it “takes a village to raise a child”, it takes a community of scholars, including faculty, peers, trainees, and the vitality of the field, “to raise a sleep researcher, educator, or clinician”.

FUNDING SLEEP RESEARCH FOR THE FUTURE

Help to build a solid foundation for sound medical practice by contributing to the Sleep Research Society Foundation (SRSF) today! Research funded through the SRSF helps to lead to more effective medical care and improved health and quality of life for both sleep disorders patients and the general public.

The SRSF was established in 2005 to train and develop researchers and to be a proponent of research in the field of sleep. The foundation supports scientific investigations that aim to shed light on the processes of sleep, provide insight into the workings of disorders of sleep and daytime alertness, and increase the knowledge of how these disorders can be prevented and treated.

Since its inception the SRSF has funded projects from 19 investigators and has awarded almost $400,000 in support of their research.

The SRSF currently offers two grants to support the research of SRS members:

- J. Christian Gillin, MD Research Grant
- Elliott D. Weitzman, MD Research Grant

Show your support...your contributions play an integral part in the advancement of sleep research!

For more information or to make an online donation, please visit www.sleepresearchsociety.org/foundation
New SRS Leadership

**President**

Michael V. Vitiello, PhD, is a professor of psychiatry and behavioral sciences and an adjunct professor of psychology and of bio-behavioral nursing at the University of Washington, where he is also the associate director of the Northwest Geriatric Education Center. He obtained a PhD in physiological psychology from the University of Washington, where he then received post-doctoral training in clinical psychology. He also received post-doctoral training in gerontology from the VA Geriatric Research Education and Clinical Center, Seattle, WA.

An expert in sleep and sleep disorders in aging, Dr. Vitiello has authored more than 340 data-based articles, invited reviews and chapters, scientific abstracts, letters and editorials. Dr. Vitiello is the recipient of two NIMH Independent Scientist Research Career Awards and is a regular consultant reviewer for the NIH as well as for numerous other federal agencies and private foundations.

Dr. Vitiello joined the SRS in 1980. He currently chairs the scientific program committee of the APSS and serves as SRS representative on the scientific program committee for the World Federation of Sleep Research Societies Meeting, Cairns 2007. In 1985 he co-chaired the joint anniversary meeting of the SRS and the ASDC (forerunner of the AASM) in Seattle. He has served in numerous other SRS positions including: Board of Directors; Circadian Rhythms Section Head; SRS nominations committee; chair of the SRS international outreach program task force, and international outreach committee; SRS representative to the APSS scientific program committee; SRS representative to the planning committee for the Joint Conference on the Circadian Control of Sleep (SRS and Society for Research in Biological Rhythms); and, founding course director, and subsequent co-director, of the SRS "Primer of Sleep Research" annual course.

**President-Elect**

Clifford B. Saper received his M.D. and Ph.D. degrees and did his internship in internal medicine at Washington University School of Medicine in St. Louis, before doing a neurology residency at Cornell University Medical Center-New York Hospital. He then joined the faculty of Washington University School of Medicine where he served from 1981-1985 as Assistant Professor of Neurology and Anatomy and Neurobiology. He then moved to the University of Chicago, where from 1985-1992 he was an Associate Professor, then William D. Mabie Professor of Physiology and Neurology, and Chairman of the Committee on Neurobiology. In 1992, he moved to his present position at Harvard Medical School, where he is the James Jackson Putnam Professor of Neurology and Neuroscience and Chairman of the Harvard Department of Neurology at Beth Israel Deaconess Medical Center. Dr. Saper also has served since 1994 as the Editor-in-chief of the *Journal of Comparative Neurology*, the oldest basic neuroscience journal in the English language. He also serves on the Editorial Boards of *Neurology, Journal of Neuroscience*, and *Physiological Genomics*. Dr. Saper has received a Javits Neuroscience Investigator Award from the National Institutes of Health, and was named one of the 100 most frequently cited neuroscientists by the Institute for Scientific Information. He has served as Vice President and Councilor of the American Neurological Association, and has served on the Publications Committee and has chaired the Program Committee of both that organization and the Society for Neuroscience. Dr. Saper has been named a Fellow of the American Academy of Neurology, the American Association for the Advancement of Science, and the Royal College of Physicians (London). Dr. Saper’s research has explored circuitry of the brain that controls basic functions such as wake-sleep cycles, brain responses to immune stimulation, and the brain’s control of the cardiovascular and respiratory systems.

**Secretary Treasurer**

Ronald S. Szymusiak received his PhD, in Biological Psychology from the University of Illinois in 1982 and did postdoctoral training in Neurobiology at the University of California, Los Angeles from 1983-1985. He is currently Adjunct Professor in the Departments of Medicine and Neurobiology at the David Geffen School of Medicine, UCLA, and Research Career Scientist with the Veterans Administration, Greater Los Angeles Healthcare System. His research examines basic neurobiological mechanisms of sleep regulation, interactions between sleep and thermoregulation and circadian regulation of sleep. He has formerly served SRS as Membership Committee Chair (1991-1993) and as Program Chair for Trainees (2000-2002). He has also served as Program Committee Chair for APSS Meeting (2003-2004).
NEW BOARD MEMBERS

Janet Mullington, PhD is Associate Professor of Medicine at Harvard Medical School. She is Director of the Human Sleep and Chronobiology Research Unit at the Beth Israel Deaconess Medical Center and Assistant Program Director of the General Clinical Research Center at the Beth Israel Deaconess Medical Center. Dr. Mullington did her doctoral work at the University of Ottawa in Canada and conducted her post-graduate studies at the Max-Planck Institute for Psychiatry in Munich Germany and at the University of Pennsylvania in Philadelphia. Her work involves the effects of sleep loss on inflammatory and neuroendocrine systems. She directed the clinical sleep lab at the Beth Israel Deaconess Medical Center from 1997-2002. She has served the SRS as a member of the SRS Educational Committee from 2002-2005, and has been a member of the APSS Program Committee from 2005-2008.

Thomas Scammell, MD, is an Associate Professor of Neurology at Harvard Medical School and Beth Israel Deaconess Medical Center. He received his medical degree from the University of Massachusetts, where he also trained in Medicine. He then completed a residency in Neurology at UCSF. His research focuses on the neurobiology of sleep and the neural basis of narcolepsy. Dr. Scammell has written over 75 original research articles and reviews. He has received several NIH grants and serves on the Biological Rhythms and Sleep Study Section. He organizes the Sleep and Circadian Rhythms DataBlitz at the annual SFN meeting and is on the Editorial Board of Sleep. In the SRS, he is a member of the Research Committee and the Presidential Task Force on Research Funding.

Terri Weaver, PhD, RN, FAAN is recognized nationally and internationally for her research on the effect of illness on the conduct of daily behaviors and assessment of treatment outcomes, particularly in sleep disorders. She is Professor of Nursing and Chair of the Biobehavioral and Health Sciences Division, School of Nursing, University of Pennsylvania. She also holds a secondary appointment in the Division of Sleep Medicine, School of Medicine, University of Pennsylvania.

Dr. Weaver developed the first instrument to measure functional status in disorders of excessive sleepiness. This measure, the Functional Outcomes of Sleep Questionnaire, has been employed in outcomes research and clinical trials both nationally and internationally. Dr. Weaver is the Principal Investigator of an international multi-center efficacy study designed to evaluate continuous positive airway pressure (CPAP) treatment in milder obstructive sleep apnea (OSA). Dr. Weaver has characterized the nature of adherence in OSA and has described the dose response relationship between adherence to CPAP and clinical outcomes. Her articles have been published in high impact journals with over 300 citations. Dr. Weaver’s current research is supported by the National Heart Blood and Lung Institute of the National Institutes of Health. Dr Weaver is a Fellow of the American Academy of Nursing, Senior Fellow of the Leonard Davis Institute for Health Economics, member of the Center for Sleep and Respiratory Neurobiology, and as well as the Institute on Aging, School of Medicine, University of Pennsylvania. Her public service has included serving as Chair of the national Board of Directors of the American Lung Association and Vice Chair, Steering Committee, National Sleep Awareness Roundtable.

TRAINEE MEMBER AT LARGE

Eliza Van Reen is the Trainee Member at Large for the Sleep Research Society. Her research interests include sleep, circadian rhythms, endocrine physiology and cancer.

Dr. Van Reen has been a recipient of the Sleep Research Society’s Trainee Merit-Based Travel Award, the Brown Medical School Department of Psychiatry Research Day Pre-Doctoral award, and the William C. Dement fellowship in Sleep and Chronobiology Behavioral Science Research.

She is currently a postdoctoral fellow at Harvard Medical School and the Brigham and Women’s Hospital in Boston, Massachusetts.
SRS Supports the National Sleep Awareness Roundtable

The Sleep Research Society has been actively involved in the National Sleep Awareness Roundtable (NSART) and is excited to share information with its members about the coalition’s current initiatives and accomplishments. The SRS believes that NSART has great potential to help the sleep research field by improving public awareness about sleep.

Mission, Goals and Strategy of NSART

NSART is a national coalition of governmental, professional, voluntary, and other organizations whose mission is: 1) to raise awareness about; 2) to increase the understanding of; and 3) to reduce the public health and safety impact of sleep deprivation and sleep disorders by improving communication and collaboration among local, state and federal agencies; professional organizations; and the public.

Through its collective efforts, NSART will work:
1. To increase public awareness about sleep, sleep disorders, and the consequences of sleep deprivation;
2. To promote science-based public policies;
3. To advance basic, clinical, applied, and population-based research; and
4. To promote recognition of and access to care for all individuals with sleep disorders.

NSART’s strategy is focused on promoting sleep as one of the three pillars of health (joining diet and exercise), and improving recognition of the signs and symptoms of sleep disorders.

Brief History

The formation of NSART has been an historic achievement. Beginning in 2004, more than twenty federal agencies, organizations and medical societies came together for multiple successful planning meetings. The effort to form a coalition was supported by congressional language in fiscal years 2005-2007. The SRS played a substantial role in the planning process and officially joined NSART prior to its launch in March of 2007.

NSART’s founding members were the National Sleep Foundation (NSF) and the Centers for Disease Control and Prevention (CDC). The CDC’s main liaison to NSART is its National Center for Chronic Disease Prevention and Health Promotion. The Center was a natural fit due to its expertise in epidemiology and since its work includes a focus on the negative health consequences that are related to sleep loss, such as diabetes, obesity, stroke, and heart disease.

Key Successes for the Coalition

NSART has accomplished much in the brief time since its official launch last year. During a very tight budget year, the coalition was able to secure specific, new appropriations for sleep programs at the CDC. This funding is currently supporting a question on sleep quality in the CDC’s Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey of 350,000 households in the U.S. Additionally, in 2009, 12 states will incorporate a new five-question sleep module as part of the BRFSS. Separately, the CDC was able to incorporate a question on sleep into the 2007 Youth Risk Behavior Surveillance System (http://www.cdc.gov/HealthyYouth/yrbs/pdf/yrbs07_mmwr.pdf). This survey found that only 31% of students had 8 or more hours of sleep on an average school night. The epidemiological data generated from these surveys will be fertile ground for new sleep research.

The CDC has also launched a new Web site on sleep as a result of the coalition: www.cdc.gov/sleep. The site provides an overview of the public health challenges associated with sleep and sleep disorders. The agency also participated in National Sleep Awareness Week® and held an internal workshop on sleep that featured the winners of the NSF/SRS Young Investigators Conference. The CDC also published a groundbreaking epidemiological study on sleep based on 2006 BRFSS data (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5708a2.htm). It found that, on average, 10.1% of respondents reported insufficient rest or sleep every day during the preceding 30 days.

In early 2008, NSART nominated obstructive sleep apnea screening to be considered as a clinical preventive service for review by the United States Preventive Services Task Force, an independent panel that provides recommendations to primary care physicians through the Agency for Healthcare Research and Quality. If accepted, screening for sleep apnea within the primary care setting would become more common.

Support NSART

SRS calls on its members to ask Congress to support NSART and to expand federally supported epidemiological sleep research. You can quickly and easily call or email your legislators in Washington by visiting the National Sleep Foundation’s Web site at www.sleepfoundation.org/advocacy.

John Rancourt
National Sleep Foundation

Mark Opp, PhD
SRS Representative to NSART
1. **Joseph De Koninck, PhD elected to the Royal Society of Canada**

Joseph De Koninck, PhD, Professor of Psychology was recently elected into the Royal Society of Canada. Dr. De Koninck is internationally recognized for his work on dreaming and has published extensively on the impact of dreaming on waking life, the role of sleep in learning and memory, the chronobiological factors behind napping, and the treatment of insomnia. Election to Fellowship in the Royal Society of Canada is the highest academic accolade in Canada that is available to scientists and scholars. After their induction in the Society, Fellows are allowed to use the postnomial FRSC for Fellow of the Royal Society of Canada in English, or MSRC in French for Membre de la Société royale du Canada, according to the language of the Fellow.

2. **Charles Czeisler, PhD, MD, appointed to Massachusetts Drowsy Driving Commission**

Former SRS President, Charles Czeisler, PhD, MD, has been appointed by Massachusetts Governor Deval Patrick to serve as a member of the newly created Drowsy Driving Commission for the Commonwealth of Massachusetts. The formation of this commission was included in the Junior Operator Law that was signed into law last year as a result of the efforts of the Sleep Research Society’s Presidential Task Force on Sleep and Public Policy.

3. **New Research Funding Database Available to SRS Members**

SRS Members now have access, via our Web site, to an outstanding resource for grants and other funding opportunities for research.

Members will now have access to a well-respected national database created by the Foundation Center. This database is easy to use and is extensively indexed to assist in refining searches. In addition to the indexing there is also a key word search and an easy-to-follow help section that guides users through the search process.

The database can be accessed at the SRS Web site http://www.sleepresearchsociety.org/News.aspx?id=942. You must sign in with your SRS username and password for access to the database.

4. **Sleep Research Society Foundation Grant Opportunities 2008**

The Sleep Research Society Foundation (SRSF) is offering two grant opportunities to advance basic sleep research, foster the careers of young and career investigators, and provide critical support for scientific investigation.

Young investigators are encouraged to apply for the J. Christian Gillin, MD, Research Grant. The purpose of the grant is to aid beginning investigators in sleep research with 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.

The Elliot D. Weitzman, MD, Research Grant is intended for seasoned researchers to gather additional pilot data for NIH or other federal grants that are scored, but not funded, with the assumption that these grants have been reviewed by NIH or equivalent. The grants that will be considered for this award are ones that have a strong foundation but lack adequate preliminary data or feasible evidence. The grant includes one year of support in the amount of $20,000.

More information on these grants, including guidelines and applications, can be downloaded from www.sleepresearchsociety.org/foundation/. The submission deadline for the receipt of proposals is December 1, 2008. Please contact John Slater via e-mail jslater@srsnet.org with any questions.

5. **National Sleep Foundation Pickwick Postdoctoral Fellowship For Basic, Applied, and Clinical Sleep Research**

As part of its ongoing commitment to advancing sleep research, the National Sleep Foundation (NSF) is pleased to offer a postdoctoral fellowship opportunity and invite interested candidates to apply!


For more information, visit www.sleepfoundation.org/pickwick or contact nsf@sleepfoundation.org.
6. SRS Supports Increase in Funding for NIH

On June 26th, the Senate Appropriations Committee approved the Labor, Health and Human Services, and Education appropriations bill for fiscal year 2009 (FY09). This appropriations bill includes an increase in funding to the NIH of $1.025 billion over the previous year. If this proposed increase is signed into law, total NIH budget for FY09 will be $30.2 billion. The House Appropriations Committee has not acted upon NIH funding to date.

The Sleep Research Society sent a letter to Senator Robert Byrd (D-West Virginia), Chairman of the Senate Appropriations Committee, and Representative David Obey (D-Wisconsin), Chairman of the House Appropriations Committee, indicating our support for an increase in NIH funding.

The SRS will keep members up-to-date as Congress continues its work on FY09 appropriations.

On a related matter, President Bush signed a supplemental appropriations bill into law to provide the Department of Defense with funding for ongoing activities in Afghanistan and Iraq. Included in this legislation is an additional $150 million for the National Institutes of Health to be used specifically for research purposes. The language for the NIH funding included in the supplemental appropriation can be viewed at the following website:


The NIH funding information is found on page 25 of this link.

7. Your Input is Needed as PhenX Launches a Demographics Measures Survey

The project PhenX, for Phenotypes and eXposures, is funded by National Institutes of Health’s, National Human Genome Research Institute. The goal of the project is to select 15 measures for up to 20 research domains that will be recommended for use in genome-wide association studies (GWAS) and other large-scale genomic studies. The active input from researchers is critically important for this consensus effort. We are seeking input from the research community through a web-based survey. Your expertise and insight will be extremely valuable while developing an effective consensus process.

On July 7th, at www.phenx.org, the Demographics Measures Survey was released. Active input from the research community is critically important to this consensus effort, and we are seeking your review and comment. In this survey, researchers will have an opportunity to rate the usefulness and the priority of the domain measures, make suggestions to include other measures, comment on the protocols and procedures for each of the proposed measures, and provide specific feedback about any or all measures. Survey responses will be anonymous. To take the survey, follow this link: www.phenx.org/surveys.

Comments received will be used by the PhenX Demographics Working Group to build consensus on a set of measures for inclusion in the PhenX Toolkit. The idea behind the Toolkit is to make it easy for researchers to include standard measures in their genomic studies, thus greatly increasing the opportunity for cross study analysis.

8. Call for Nominations-Distinguished Scientist Award

The Distinguished Scientist Award is the Sleep Research Society’s highest award and recognizes significant, original and sustained scientific contributions of a basic, clinical or theoretical nature to the sleep research field. The Sleep Research Society encourages members to submit nominations for this honor to the Board of Directors. Please include a letter outlining the scientific contributions made by the nominee and indicators why the individual should receive the award. Candidates are not required to be members of the Sleep Research Society.

The deadline to submit nominations for the SRS Distinguished Scientist is Friday, October 17, 2008.

Mail your nominations to the Sleep Research Society, Attn: John Slater, One Westbrook Corporate Center, Suite 920, Westchester, IL 60154, or submit the information via e-mail to jslater@srsnet.org.
The power of *C. elegans* to study sleep, a circuit problem: Sleep arose early in animal evolution, and has been observed in every animal, indicating that it serves a key function. We have shown that the nematode *C. elegans* has a sleep-like state. This stage, called lethargus, occurs during the four larval stage transitions. It has the sleep-like behavioral properties of reversibility, increased arousal threshold, and homeostasis. Studies in *C. elegans* as well as in *Drosophila* have identified genes regulating sleep and sleep-like behavior, which also appear to regulate mammalian sleep. These include Epidermal Growth Factor (EGF), Potassium channels, cGMP-dependent protein kinase, and genes affecting cAMP signaling. These genes all have other functions in animal development and physiology. How then does the specificity of these genes in regulating sleep happen? The answer is in the neural circuitry. It is the function of these multi-function genes in particular neurons that regulates sleep. This contrasts with circadian regulation, which can occur at a single cell level. Therefore, to understand sleep regulation, it is important to study the function of genes in defined circuits. With respect to circuit analysis, *C. elegans* is a powerful model system. This organism contains 302 neurons and connections between these neurons are known at the ultrastructural level. Despite its compact size, the worm nervous system uses most of the major neurotransmitters used in humans including dopamine, GABA, serotonin, glutamate, and acetylcholine. The neurotransmitters used by most *C. elegans* neurons are known. Conserved genes are also used in the *C. elegans* sensory nervous system for responding to various sensory modalities including mechanosensation, olfaction, and taste, and for synaptic communication between neurons.

**Project 1: the role of timing genes in regulation.** Whereas in mammals, the core circadian gene PERIOD and the metabolically-linked nuclear hormone receptors (NHR) change their expression with the circadian cycle, in *C. elegans*, genes that are orthologous to PERIOD and NHRs change expression with the larval molting cycle. Therefore expression of these genes maintains a constant phase relationship with sleep and sleep-like behavior in both mammals and nematodes. We therefore hypothesize that activity of one or more of these genes regulate the timing of lethargus in *C. elegans*. This hypothesis can be tested with a combination of mutant analysis and with transgenic experiments. Analogous to mammals and *Drosophila*, where behavioral rhythms are regulated by an oscillator in a core neuronal cell group, we believe that timing of lethargus will localize to a small number of neurons, perhaps as few as one single neuron. This line of experiments will get at the neuronal locus of the timing mechanism of sleep-like behavior in worms.

**Project 2: the role of PKG signaling in regulation.** We have identified a cGMP stimulated protein kinase (PKG) gene as a regulator of lethargus. Increased activity of this gene promotes sleep-like behavior during the adult stage whereas reduced activity of this gene is associated with reduced sleep and increased responsiveness during lethargus. This increased responsiveness during lethargus in these mutants is rescued by expressing PKG in sensory neurons. These transgenic experiments, coupled with research from other labs showing a role for PKG in chemosensory adaptation, suggest that PKG promotes sleep by dampening sensory input during lethargus. That is, it functions in sensory gating during sleep. Current experiments in the lab are aimed at further testing this hypothesis. In addition, we are using the power of forward genetic analysis to identify the signaling pathway downstream of PKG. Finally, with an eye toward the future translation of these genetic findings in the worm to the

**Research theme A: The regulation of sleep-like behavior in *C. elegans.***
clinic, we have begun to explore the role of PKG in *Drosophila*. Our preliminary results suggest that as in worms, increased PKG activity promotes sleep in fruit flies.

**Project 3: the role of cAMP signaling in regulation.** One established signaling pathways regulating wakefulness in Drosophila involves elevation of cAMP levels. For example, *Drosophila dunce* mutants, which have impaired function of an enzyme that degrades cAMP and therefore have elevated cAMP levels, show increased wakefulness. We have evidence that cAMP signaling has a similar function in worms, since mutants with increased cAMP levels show increased responsiveness during lethargus. Our current experiments are aimed at understanding the anatomical basis of this effect and to relate cAMP signaling to PKG signaling using classical genetic methods.

**Research theme 2: The function of sleep-like behavior in *C. elegans*.** One approach to understanding sleep function is to look for commonalities between sleep in various species. Looking only at total sleep time, there is tremendous variation among mammals alone, a variation that was proposed to be partially explained by ecological factors (Siegel JM. Clues to the functions of mammalian sleep. *Nature* 2005;437(7063):1264-71). There are larger differences. For example, unihemispheric sleep is observed in cetaceans but not in terrestrial mammals, yet few would argue that whales and dolphins do not sleep. Given this heterogeneous expression of sleep in even closely related species, it is no surprise that the worm sleep-like state seems quite different from mammalian sleep, notwithstanding the behavioral and genetic similarities. One research theme in our laboratory is to attempt to distill features that are common between worm lethargus and mammalian sleep. We are approaching this question by performing gene profiling experiments across larval development. In addition, we are performing carefully timed behavioral experiments and viewing synapse formation in developing animals to determine the effect of lethargus on synaptic plasticity.

**Clinical Activities**

Dr. Raizen sees patients with sleep disorders at the Penn Sleep Center outpatient practice. In addition, he attends on the Neurology consult service at the Hospital of the University of Pennsylvania.

**Training Opportunities**

Dr. Raizen is an assistant professor in the Department of Neurology and is part of the Center for Sleep and Respiratory Neurobiology. His lab is adjacent to the *Drosophila* sleep recording lab, thereby facilitating collaborations between investigators in these two powerful systems. There are currently research training opportunities for both graduate students and post-doctoral fellows. Dr. Raizen is affiliated with two graduate programs at the University of Pennsylvania, The Neuroscience Graduate Group (http://www.med.upenn.edu/ins/ngg.html) and the Cell and Molecular Biology graduate group (http://www.med.upenn.edu/camb/). Post-doctoral fellows may qualify for an NIH-funded T32 training grant. Clinical fellows can combine research training with clinical training in the University of Pennsylvania ACGME-accredited sleep training program (http://www.med.upenn.edu/sleepctr/Education.shtml). In addition to training in sleep and circadian biology, trainees would have the opportunity to learn a variety of state-of-the-art *C. elegans* methods including forward and reverse genetics (including RNA interference), molecular cloning and microarray technology, laser microsurgery of individual neurons, microscopy, and an extensive array of behavioral assays. In addition, a motivated trainee can adapt to our system the in vivo imaging of excitable cell function in behaving animals as well as optogenetic technology, where light is used to control the activity of defined neurons. To inquire regarding training opportunities, please contact Dr. Raizen (raizen@mail.med.upenn.edu) or Margaret Stone Higgins (msh2@mail.med.upenn.edu).

**Representative Publications**

Investigative work in our research group focuses on circadian and homeostatic regulation of human sleep, alertness, cognitive performance, mood, memory consolidation and thermoregulation, and applying that knowledge to ageing as well as to sleep and psychiatric disorders. Current research interests include: 1) Effects of aging on circadian and homeostatic regulation of sleep, performance, mood and thermoregulation 2) Sleep and circadian rhythms in women with vascular dysregulation 3) Non-visual effects of light on circadian physiology 4) Circadian rhythms and sleep in psychiatric disorders 5) Therapeutic effect of bright light treatment in depression during pregnancy, women with vascular dysregulation and in borderline personality disorder.

**Current Research Projects**

**Basic Human Research Projects**

Circadian and homeostatic influences on sleep, performance, thermoregulation and mood in moderately depressed women

We have completed an extensive investigation of circadian and homeostatic influences on sleep, performance, thermoregulation and other variables in healthy young and older men and women. This provides a detailed background to investigate the above changes in young, moderately depressed women. In this study, depressed volunteers enter our chronobiology laboratory for 4 consecutive days and follow a protocol with much sleep (naps) or sleep deprivation. We hope to pinpoint specific disturbances in circadian or sleep-dependent mechanisms that will allow selective and optimal chronobiological treatments of depression (e.g. light).

**Thermophysiology and sleep**

In women with vascular dysregulation and difficulties initiating sleep four different interventions are presently under investigation in a mixed-ambulatory-lab-cross-over-design. These interventions include a phase delay of the sleep-wake cycle, a phase advance of the circadian system by morning light or an evening heat load prior to habitual bedtimes - all should lead to a reduction in sleep onset latency. Furthermore, in collaboration with the University Eye Hospital Basel, we are studying the influence of melatonin on choroidal blood flow and thermoregulation in women with vascular dysregulation and controls.

**Specific genetic traits and age-related changes in the circadian and sleep homeostatic process**

Research conducted at the University of Surrey (UK) on one of the PER clock genes known to be involved in diurnal preference (i.e. late or early chronotype) has focused on circadian and sleep physiology of individuals possessing the homozygous type of PER3 polymorphism. We aim to investigate whether specific genetic traits influences age-related changes in the circadian and sleep homeostatic process.

**Learning, sleep and the circadian system**

We are studying the interactions of learning (e.g. simple and difficult word pairs) circadian phase and sleep, to see what factors are important for retention and recall, and what characteristics of the sleep EEG reflect this learning process and its efficiency.
Clinical Human Research Projects

A controlled double blind study of light therapy for depression during pregnancy

The incidence of major depression during pregnancy is surprisingly high (ca. 10%). Since we do not exactly know what the long-term developmental effects of antidepressant drugs are on the unborn child, there is much interest in finding effective non-pharmacological treatments for depression during pregnancy. This randomized double-blind placebo-controlled study investigates the antidepressant efficacy of light therapy under controlled conditions.

Circadian rest-activity cycles and cognitive performance in schizophrenia and the effect of antipsychotic medications

Sleep disturbances in schizophrenic patients are often coupled with negative symptoms and behavioral daytime problems. How much of this is improved or exacerbated by different antipsychotic medications is the aim of this study, in particular to see whether the newest generation of atypical neuroleptics stabilize sleep-wake cycles.

Circadian rest-activity cycles and cognitive performance in women with borderline personality disorder (BPD) and the effects of light therapy

First results indicate that abnormal melatonin and sleep-wake rhythms are common in women with BPD. The purpose of the study is to investigate whether normalization of those rhythms by properly timed light treatment can alleviate symptoms often seen in BPD such as depression, daytime fatigue and self-mutilating behavior.

Technical Capabilities

The Centre for Chronobiology in Basel, Switzerland has facilities and equipment to conduct both ambulatory field and laboratory studies.

Facilities include:

- two (5 in 2009) fully equipped suites to carry out constant routine protocols for intensive physiological monitoring. For nearly twenty years we have utilized the constant routine protocol (with different variations) in order to be able to unmask the endogenous circadian component of various thermoregulatory, neuroendocrine, EEG, performance and behavioral rhythms controlled by the circadian pacemaker. By scheduling a night’s sleep before and after the constant routine, we can also study sleep regulation without confounding postural or environmental influences.
- one “chrono” apartment (finished in 2009) for longterm studies (e.g. forced desynchrony protocols etc.)

Equipment:

- Fully digitized recorders for polysomnography (each: 28 channel-EEG, respiration, ECG, galvanic skin response, EMG, EOG, markers for evoked potentials etc.)
- Fully digitized recorders for body temperatures (different skin temperatures and core body temperature)
- Different analysis software for EEG spectral analysis and the analysis of autonomous parameters (i.e. heart rate variability, temperatures etc.)
- Ibuttons to record skin temperatures in an ambulatory setting
- Actimetry devices to record wrist activity/light exposure
- CANTAB neurocognitive test battery and other neurobehavioral test batteries
- Monochromatic light devices
- Bright light devices for therapeutic use
- Assays for melatonin and cortisol measures
- Cell-based assays to correlate human circadian behavior with clock function

Training Opportunities

Our group can offer research opportunities for PhD students, master’s students, postdoctoral fellows and physicians in training. Enquiries can also be made if positions for sleep technologists, study nurses and research assistants are sought.

Selected Publications

Recent (from 2005)


Selected (before 2005)


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 Web site (www.sleepresearchsociety.org).

**Regular Members:**

- John F Araujo, MD, PhD
- Sanford H Auerbach, MD
- R. Robert Auger, MD
- Patricia A Carter, PhD
- Orna Chishinski, DSC
- Chin Moi Chow, PhD
- Fabiana D’Aniello, PhD
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- Ying Wang, PhD
- Loretta Wubbel, DO
- Universidade Federal Do Rio Grande Do Norte, Natal, BRAZIL
- BUSM, Boston, MA
- Mayo Center for Sleep Medicine, Rochester, MN
- University of Texas at Austin, Austin, TX
- Emek Yezeel College, Nofit, ISRAEL
- The University of Sydney, Lidcombe, AUSTRALIA
- Drug Development, Ferrer Internacional S.A., Barcelona, SPAIN
- Eindhoven, NETHERLANDS
- West Australian Sleep Disorders Research Institute, Nedlands, AUSTRALIA
- University of Maryland, Baltimore, MD
- Sleep and Headache Care, Jaipur, INDIA
- Thomas Jefferson University, Philadelphia, PA
- Neuro-Behavioural Biology Center, Nakornpathom, THAILAND
- Impax Pharmaceuticals, Hayward, CA
- Canadian Sleep Insitute, Etobicoke, CANADA
- Osbakken Consulting, LLC, Philadelphia, PA
- Summa Health System, Akron, OH
- ENH, Glenview, IL
- Johns Hopkins University, Baltimore, MD
- Akita University School of Medicine, Akita, JAPAN
- Pickaway Health Services, Circleville, OH
- Centre of Sleep and Wake Disorders, Heeze, NETHERLANDS
- Grand Valley State University, Grand Rapids, MI
- HSTVMH/University of Missouri, Columbia, MO
- Eli Lilly and Company, Indianapolis, IN
- University of Alabama at Birmingham, Birmingham, AL
- Consolidated Research, Inc., Euclid, OH
- Swiftwater, PA

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- Judith A Hays
- Malcom Hollander
- Janis M Leibold
- Ruhi P Snyder, RPSGT
- Maryan Stubbs
- Walter Reed Army Medical Center, Washington, DC
- Somnus Therapeutics, Bedminster, NJ
- Florida Sleep Institute, Spring Hill, FL
- Macrolol Hollander, Galloway, NJ
- FM Network, Tucson, AZ
- Limestone Sleep Laboratory, Kingston, CANADA
- University of Wisconsin-Madison, Madison, WI
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<th>Affiliation</th>
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<td>James Clinton</td>
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<td>Jeff Donlea</td>
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<td>Joseph R Plaksin</td>
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<td>Anjali Rao</td>
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<td>Meghan K Rautiola</td>
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<td>WRAIR, Silver Spring, MD</td>
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<td>Barbara B Richardson</td>
<td>Liberty Lake, WA</td>
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The Associated Professional Sleep Societies, LLC (APSS) Program Committee will soon be accepting abstract submissions and session proposals for SLEEP 2009, to be held June 6–11, 2009 at the Washington State Convention and Trade Center in Seattle, Washington.

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