BULLETIN

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APSS 16th Annual Meeting ♦ June 8-13, 2002 ♦ Seattle, Washington

BULLETIN

A Publication of the Sleep Research Society, USA
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Dear SRS Members,

The privilege to serve as SRS President is both invigorating and daunting-invigorating from the terrific scientific excitement and continued growth of sleep research in its many manifestations, and daunting because growth brings the need for more volunteers and organizational structure to manage resources and initiatives. The growth is tangible in so many aspects of SRS activity. For example, APSS 2001 set new records for numbers of symposia, scientific abstract submissions, and attendance (up from 3,800 in 2000 to approximately 4,100 in 2001). The continued growth of the meeting requires even greater advance planning. APSS 2002 occurs June 8-13, 2002 in Seattle, Washington. The APSS Program Committee has set an abstract deadline of November 19, 2001. Planning for APSS 2003 (Chicago) has been underway for more than a year. This meeting will mark the 50th anniversary of the discovery of rapid eye movement sleep. At the request of the APSS Joint Operations Committee, Dr. Tim Roehrs has been developing initiatives and special events to mark this 50th anniversary.

Continued growth of the annual scientific meeting has meant SRS has had increasing resources available to support the things that matter most to our society-initiatives on scientific discovery and information exchange, and on scientific funding and training. New examples of SRS's growing support of such initiatives abound. A workshop on "Bioinformatics in Neuroscience and Sleep Research" jointly sponsored by SRS, AASM, NHLBI, and NCSDR, was held at NIH July 16-17, 2001, and broadcast on the internet (see the article in this issue). In recent weeks the SRS Board reviewed four applications for trainee travel awards to scientific meetings, and elected to support a trainee workshop in basic sleep at the WFSRS Congress on the "Physiological Basis for Sleep Medicine," October 21-25, 2001, in Punta del Este, Uruguay. The Board also elected to fund the first SRS Section Initiative for a 1-day symposium at the May 22, 2002 meeting of the Society for Research in Biological Rhythms (SRBR) entitled "Circadian Rhythms and Sleep: Views to the Future," in conjunction with SRBR and NIMH. Last, but certainly not least, the SRS's new Junior Faculty Development Program received and reviewed three applications in response to its first solicitation. The SRS Board is in the process of selecting the outstanding entry. All of these activities were made possible by the creativity, hard work, and generosity of many SRS members-both those who developed and proposed the ideas, and those who served on the growing number of committees and task forces needed to evaluate proposals and make recommendations to the Board for support for the most meritorious applications.

Continued growth has also led to efforts to enhance SRS member services and increase the professional nature of the society's business decisions and budgetary management. Here again, there are many initiatives. One in particular is very exciting. A thorough evaluation of the society's web-based needs has been ongoing for 2 years. Under the able stewardship of SRS's Web Service Committee, we are close to completing the final stages of a contract agreement that will launch the development of a new SRS web site designed to handle the current and future needs of the society. SRS is also actively working in partnership with AASM to ensure that the journal SLEEP and the APSS meeting continue to meet the highest scientific standards. The Joint Operations Committee (JOC), which is currently chaired by SRS President-elect, Dr. Ruth Benca, supervises the management, oversight and facilitation of the Journal SLEEP, and the APSS Meeting. The JOC consists of three representatives appointed from the SRS Board of Directors and three appointed from the AASM Board (typically these are the Past-President, President, and President-Elect of each society.) The JOC will meet September 8-9, 2001 in Chicago to appoint an Editor Search Committee and discuss ways to evaluate the annual scientific meeting.

Thanks to the efforts of many of our member volunteers, the scientific support for sleep research from NIH and other federal agencies, and our excellent working partnership with the AASM, the SRS has continued to grow the resources it needs to launch new initiatives and policies that have further enriched and expanded its scientific mission. SRS Past-President, Dr. Ralph Lydic-who together with Dr. Mary Carskadon so ably tutored me during my Presidential apprenticeship-has already acknowledged in the Spring 2001 SRS Bulletin the debt of gratitude owed to the member volunteers who completed their terms of office in June, 2001. It is my privilege in this issue to congratulate the recently elected SRS officers: Dr. Ruth Benca (President-Elect); Dr. Michael Vitiello (Section Head for Circadian Rhythms); Dr. Christine Acebo (Publications Committee Chair); and Dr. Scott Doran (Trainee Representative). In addition, I extend congratulations to Dr. David White (new APSS Program Chair). Finally, on behalf my Presidential predecessors, I express heartfelt thanks to Lance Brink, who has served these past 2 years as SRS Administrator in the central office. Lance has moved to another position in the AASM but continues to help SRS transition to the new Administrator, Brian Nelson. Brian came to SRS from the Mayo Clinic, where he was an accounting associate. He is currently enrolled in an MBA program. Please don't hesitate to contact Brian or me should you have questions about SRS operations, or wish to volunteer your time and talents. Brian can be reached at 507-285-4384 (BNelson@aasmnet.org).

Don't forget the APSS 2002 abstract deadline is November 19, 2001.

--David Dinges

Editor's Column

by Larry D. Sanford, PhD

Science can be an enormously satisfying career path, but establishing a successful career as a scientist has probably never been tougher, particularly in the traditional academic track. It also requires skills that go well beyond those we are trained to perform at the bench. Scott Doran addresses this and other issues in his essay in student BITS on training for a career in science.

However, it truly is the ideas that drive science, and ultimately produce any individual or group success. Therefore, it seems appropriate that this issue announces the 2002 SRS Awards that recognize individual achievement, and the winners of the SRS Essay Award Program, some of whom may one day strive to join the ranks of working scientists.

I would also like to direct your attention to a thought-provoking letter on the nature of mental attributions during dreaming contributed by Dr. Edward Pace-Schott. I would like to encourage submissions that can stretch our thinking about the many facets of our field.

Lastly, with this issue of the Bulletin, Brian Nelson assumes the role that has been so ably filled by Lance Brink. I would like to thank Lance for the incredible job he has done, and wish him well as he assumes a greater, and different range of duties. I also would like to welcome Brian, and I look forward to working with him.

As always, your contributions and suggestions are welcome.

"THEORY OF MIND," SOCIAL CONGNITION AND DREAMING

by Edward F. Pace-Schott
Co-Chair, Section on Dreams,
American Academy of Sleep Medicine
Laboratory of Neurophysiology,
Department of Psychiatry,
Harvard Medical School, Boston, MA

It is notable that in our dreams we preserve our capacity to attribute mental states to others (i.e., the characters in our dreams). In terms now familiar to cognitive neuroscientists and autism researchers (see Baron-Cohen 1995, 2000), we retain in our dreams the ability to form a "Theory of Mind" (ToM) or to "mind-read" (Baron-Cohen 1995). This is especially notable in that other executive capacities such as logical reasoning as well as more basic building blocks of executive capacities such as working memory and attention are impaired during dreaming (Hobson et al. 2000).

There are a multitude of examples of interpersonal mind-reading in dreams. Simply think back to the last time you made mentalistic attributions to a character while dreaming that fit within the generic formulation "he/she thinks that I want/think that he/she wants/thinks/will do..." Simpler to more complex variants of such attributions fulfill criteria for passing at least first and second order theory of mind tasks, capacities developing in normal childhood (Baron-Cohen 1995; Stone et al. 1998). Moreover, I suspect many adult dreams would meet criteria for passing more sophisticated ToM tasks requiring at least normal pre-adolescent mental capacities, such as the faux pas test (Stone et al. 1998), in which consideration of more complex social concepts such as "appropriateness" are tested.

One recurrent scenario from my own dreaming well illustrates preserved theory of mind capabilities as well as a dissociation between physical illogic and preserved social logic. I often have flying dreams. In such dreams, I sometimes perform an "experiment" where I rise up in front of other dream characters or fly by them. To my frustration, they almost always fail to notice anything unusual. Sometimes I even ask them to look at me but don't tell them what I am about to do. I then rise into the air and usually they remain vague or unnoticing. Although physical illogic is rampant in this dream scenario--my flying, characters failing to notice me fly--I still correctly note that independent confirmation of flight, in their minds, constitutes objective proof of my flying. That is, the other person's experience is not only imagined but is given its accurate weight in terms of being a proper test of my own subjective experience. This passes at least a first order theory of mind task--I am conceiving both of their mental experience apart from mine as well as the possibility of a false belief on my part. Although I don't recall this occurring, most dream researchers would probably not discount the possibility that I might then, in my dream further consider a character hav-

ing a belief about my belief that I'm flying, thus passing a second order theory of mind task. Clearly the occurrence of first order, second order and advanced theory of mind capacities in dreaming is a simple research question easily posed by content analysis of even naturalistic data bases containing spontaneous home dreams!

There is evidence that the capacity to mind-read as well as its more refined sequelae in the social competencies of adult humans is subserved at least in part by ventral and medial portions of the prefrontal cortex. For example, functional neuroimaging studies have shown orbitofrontal activation in a simple theory of mind task involving the recognition of mentalistic vs. non-mentalistic terms. (Baron-Cohen et al. 1994) as well as medial left prefrontal activation by complex theory of mind tasks (Fletcher et al. 1995; Goel et al. 1995). In addition, individuals with damage to the ventromedial prefrontal cortex (such as the famous case of Phineas Gage) exhibit "acquired sociopathy"--the loss of normal social judgment (Damasio, 1996; Tranel et al. 2000). Similarly, individuals with orbitofrontal but not dorsolateral prefrontal lesions often fail advanced ToM tasks such as the faux pas test while retaining the ability to pass simpler theory of mind tasks (Stone et al. 1998).

Such ventromedial areas such as the anterior cingulate, the caudal orbitofrontal cortex and the subgenual cortex have been shown to re-activate in REM sleep following their relative quiescence (compared to waking) during Non-REM sleep (Braun et al. 1997; Maquet et al. 1996; Nofzinger et al. 1997). In contrast, dorsolateral prefrontal areas remain at their low NREM levels of activity relative to waking during REM (Braun et al. 1997, 1998; Maquet et al. 1996).
In his somatic marker hypothesis, Damasio suggests that a pair of circuits, both of which involve ventromedial portions of the prefrontal cortex, subserve our ability to represent to ourselves the emotional significances of complex social scenarios (Damasio 1996; Tranel et al. 2000). One of these includes actual reactivation (and reexperiencing) of peripheral somatosensory responses accompanying past emotionally salient social experiences while the other is an "as if" loop involving only central representations of these responses in primary somatosensory and limbic-related cortices. During REM sleep, the presynaptic inhibition of afferent sensory terminals (Pompeiano 1967) may permit only the operation of the "as-if" loop. Operation of this "as if" circuit alone, therefore, may be sufficient for our capacity to attribute mental states to others in dreaming.

We therefore see a putative physiological basis for one aspect of the unique cognitive profile of the dream state--impaired reasoning and memory in the presence of preserved or even enhanced capacity to interpret the emotional salience of others' behavior. In dreaming, we may more closely resemble Stone et al.'s (1998) dorsolateral prefrontal lesion versus their orbitofrontal lesion patients in that we have preserved social logic but impaired working memory.

Study of the dreams of those with diagnoses in the autistic disorder spectrum therefore becomes of great interest to general theories of dream construction as well as being relevant to understanding the pathophysiology of these neurodevelopmental disorders. Godbout et al. (1998) studied a patient with Asperger's syndrome (AS) using laboratory-based REM awakenings and found no dream recall in this individual. The most recent findings by the Godbout group on dreaming in AS were reported in the 2001 Abstract Supplement of SLEEP (Daoust et al. 2001a) and at the symposium Dream Research in Clinical Populations: Clinical, Empirical, and Theoretical Implications at this year's APSS meetings in Chicago. In REM awakenings of six AS subjects, they found that these subjects used fewer words than age and sex-matched controls to describe a variety of different dream content elements thus suggesting that less elaborate dream reports may accompany this syndrome (Daoust et al. 2001a). They suggest that this relative impoverishment of dreaming in AS as well as developmental delays in dream reporting and conceptualization of dream experience in autism (Craig and Baron-Cohen 1998) may reflect ToM deficits in individuals with autism spectrum (pervasive developmental) disorders (Daoust et al. 2001a). If the above impoverishment of dreaming in the autistic spectrum disorders proves to be generally found, it will provide a fascinating parallel with reports of global cessation of dreaming in ventromedial prefrontal disconnective lesion patients (Solms 1997).

The study of physiological sleep features which may be directly related to dreaming in patients within the autism spectrum is still in its early stages (for a brief review, see Godbout et al. 2000). In AS, possibly related features include a paucity of NREM Stage 2 sleep spindles (Godbout et al., 1998, 2000) and reduced beta spectral power over primary and associative visual areas in REM (Daoust et al. 2001b). These findings suggest, respectively, impairments of thalamocortical interactions (Godbout et al., 1998, 2000) and of visuo-perceptual functioning (Daoust et al. 2001b) in AS.

In the case of thalamocortical sytems, Godbout's group further suggests that defects in the pulvinar nucleus of the thalamus (which showed abnormalities in their case study of an AS patient) may contribute to both EEG changes and dream abnormalities in autism (Godbout et al., 1998, and R. Godbout, personal communication). At the electrophysiological level of analysis, they note that this nucleus is connected with the reticular thalamic nucleus which, in turn, mediates thalamocortical hyperpolarization subserving the

delta and spindle oscillations of NREM sleep (Godbout et al. 1998). At the neurocognitive level, the pulvinar is involved in high level sensory processing and selective attention including visual search and scanning and, therefore, its disruption may interfere with the ability to generate a dream report (Godbout et al. 1998).

In the case of the visual system, scalp regions showing REM EEG abnormalities in AS overlie the visual association areas of the temporo-occipital cortex (Daoust et al. 2001b). As noted by Godbout (personal communication), this same general region has been found by Braun et al. (1997, 1998) to be relatively activated during REM sleep in normals. Daoust et al. (2001b) note that recent neuroimaging studies have shown that regional blood flow to to this region is decreased in in autism spectrum patients (Critchley et al. 2000; Schultz et al. 2000).

Detailed studies of dream character features (e.g., Kahn et al. 2001) combined with PSG, neuroimaging and, possibly, ERP or transcranial magnetic stimulation studies may, in the future, shed new light on intriguing questions related to the cognitive neuroscience of dreaming in normals as well as the pathophysiology of cognitive deficits in autistic spectrum disorders. The comparative study of sleep and psychopathology at the levels of functional neuroanatomy, neurophysiology and phenomenology may, therefore, produce highly complementary findings and thus encourages continued interdisciplinary communication between researchers in these closely related fields.

As an added impetus for further research, a recent fascinating personal account of autistic thought (Grandin 1996, 2000) describes, like in dreaming, a highly visual, hyperassociative pattern of waking thought but, unlike dreaming, this occurs in the absence of a higher order emotional logic. In considering the potential uses for objects, Grandin (2000) reports she is able to scroll through a virtually endless series of mental images which are linked together, as has been hypothesized for transformations of dream objects (Rittenhouse et al. 1994), by the property of visual similarity. However, she reports great difficulties with generalizations based on the integration of emotion and cognition as might be used to describe a series of scenarios involving a similar social significance.

Therefore, by way of analogies between dreaming and psychopathology (e.g., Hobson, 1999, 2001), during dreaming, like the delirious patient, we are emotionally labile and illogical (Hobson 1999), but unlike the autistic patient (Baron-Cohen 1995), we are able to imagine the intentions of others and attribute to them hypothetical mental states.

ACKNOWLEDGMENTS

I wish to thank Dr. Roger Godbout, Dr. Larry Sanford and the staff of the Laboratory of Neurophysiology for their critical readings of this piece and their helpful suggestions.

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Student's BITS—— Brief Insights for Training in sleep

The Student BITS segment is an ongoing forum for issues pertaining to sleep and to the training and retention of sleep scientists, from a trainee's perspective. The function of sleep represents one of the most compelling questions of our time, or any time, and the answer could be found within our generation. How will we recognize that answer and all of its implications for brain function, once we have found it? How will we continue to attract and retain highly intelligent, well-trained, and motivated people into this endeavor?

All trainees, undergraduate, graduate, or postdoctoral, who are interested in submitting an article for Student BITS are invited to contact Scott Doran, Assistant Editor, SRS Bulletin: Student BITS:
email: *SMDORAN@mail.med.upenn.edu*

Recent Developments in Trainee Support

Scott Doran, Ph.D.

Today's young sleep researchers, like all young scientists, are expected to manage their training and career development as if they were independent contractors. As American as this self-deterministic model sounds it has been hopelessly outpaced by the complexity of today's scientific environment. Becoming a successful scientist in any age required one to be self-directed, but the traditional model of relying only on one's mentor for support vanished recently when the number of young scientists outpaced the number of faculty jobs available. Training of life scientists accelerated in the late 1960's and 1970s in response to needs predicted by government forecasters but by the 1980's universities slowed their replacement of tenured faculty. Instead universities began to rely on adjunct or assistant professors to teach courses to the extent that today adjunct faculty and graduate students teach approximately 50% of all American university classes compared to approximately 10% in the 1960's. This percentage varies by university. For instance at Yale University 70% of all classes are taught by grad students or adjuncts. Most universities do not regard adjunct (including assistant) faculty or graduate students as 'permanent' positions, because they rely on soft money and short-term contracts. The upshot for today's trainees is unprecedented job insecurity, only 25% of today's doctoral graduates can expect to find full-time, hard money, teaching/research positions at a university.

Trainees at the beginning of the 21st century are a different group than those trained even 20 years ago and we face a unique set of challenges in order to gain highly specialized skills and then parlay our extended education into a successful career. Even the definition of a successful career

has changed significantly from the days when the majority of those with Ph.D.s positioned themselves to accept tenured faculty positions. Trainees today are a much older and more diverse set of individuals than in the past and our career options extend further than inhabiting the chairs of our retired advisors. Graduate student unions have emerged to help meet the needs of a more diverse student body and postdoctoral training guidelines have been developed to help trainees prepare for a more varied set of careers.

Prior to the 1980's graduate training was typically reserved for those university students who went directly from undergraduate to graduate training. Such students were typically young healthy males, unmarried and ready to continue an august period of full-time study. Today, more Americans have attained college degrees and possess an enthusiasm to become graduate students, resulting in a graduate student body that is more varied in age, nationality, socioeconomic background, and life experience. It was not until the 1980's that student diversity became a reality and today the basic needs of all graduate students cannot be met living in university housing on student wages. Few universities were ready for an increase in the diversity of graduate students that began in the 1970s. In 1967 students at the University of Wisconsin organized themselves into a bargaining unit to pressure the administration to improve the quality of life of students. Yet these efforts were not widespread until the 1990's when a few graduate student associations (not formal bargaining units) began to align with established labor unions. The goal of the students was the same as that of the union members, gain leverage by combining their demands to university administrations to provide higher wages, healthcare, and a codified work environment for all graduate students. Sleep trainees typically come from well-funded departments and receive higher levels of training support than those in non-science disciplines. But visit a History or Romance Languages department and you will find that not everyone receives stipend supplements from their mentor, tuition waivers from their department, or health insurance coverage from a training grant. Today only about a dozen universities have graduate unions but those few have helped clarify the graduate training expectations such as setting hourly work limits for teaching assistants.
Sadly, most university administrations are not interested in having graduate students represented by a union. Unionized graduate students are guaranteed enrollment in a university subsidized health insurance program, are eligible for tuition waivers, and receive union support when grievances must be filed against university professors or departments. Many universities have agreed to work with graduate unions in determining a range of quality of life issues (including insurance for dependents and work requirements) but many schools still do not recognize the unions. Union negotiations helped reveal how much each university relies on graduate student teaching and/or teaching support - facts that were not readily apparent until the issue was brought to negotiating tables. Recognizing and bargaining with graduate unions has not lead to the bankruptcy of universities but instead insures that students from all backgrounds can afford to receive graduate training in a fair environment.

Postdocs, on the other hand, do not have the option of joining a union (yet) although their training environment is even more susceptible to exploitation. Postdocs typically choose a post-graduate school mentor based on that mentor's research and hope they will enjoy the same success with discovery and opportunity for career development as the mentor. In the best of circumstances mentors help new scientists develop the skills and contacts necessary to become colleagues. But many postdocs have became highly skilled, low paid technicians whose work is structured to serve the immediate needs of the mentor while neglecting the long-term needs of the trainee. In response to high lab to lab variation in the quality of training, national committees were assembled to create postdoctoral training guidelines detailing the minimum training needs and professional expectations that should be maintained by both trainees and their mentors. Several of America's premiere research institutions have now established offices of postdoctoral affairs in order to implement these minimum criteria while protecting the institution by providing safety and ethics training needed to meet federal research guidelines.

My postdoctoral institution, the University of Pennsylvania's Medical School, is a good example of a recently established office of postdoctoral affairs that works to maintain standards for training and productivity while providing career development training. Penn faculty and postdocs are now obligated to adhere to a clear set of postdoctoral guidelines outlining acceptable lab practices, training requirements, issues of intellectual property, and a viable grievance system. The office of postdoctoral affairs at Penn followed the advice of several reviews written in the late 1990's outlining the status and needs of postdocs in America. Because of the recent increase in life sciences Ph.D.s awarded, many postdocs have found themselves locked into being a postdoc for up to a decade due to a lack of appropriate career opportunities. Penn is working to improve the quality of current postdocs by giving them both basic research training and career development training.

The Office of Postdoctoral Affairs at Penn's Medical School covers the basic training for good lab science by offering an agenda of workshops that cover bioethics, lab and chemical safety, rules for animal and human experimentation, and guidelines for good scientific and grant

writing. Penn went on to recommend optional training objectives such as research skills development, how to create your own lab, how to write grants, public speaking, and the need for continuing education via course-work or attending conferences. This same office supports career development by offering a series of presentations focusing on job-seeking skills; CV/resume writing, developing professional contacts, and interviewing skills. They also sponsor a biomedical career fair that brings potential employers to campus so trainees can distribute their CVs and meet the human resources people from a variety of government and industry employers. Perhaps most interesting is the bi-yearly alternative career workshop series that brought professionals from many disciplines to campus to discuss how they moved from a traditional postdoc to a career outside of academia. The postdoctoral program at Penn also offers information about internships, granting agencies, postdoctoral job openings, and is developing a writer's workshop - a sort of peer to peer training for better writing.

Today the academic career landscape is more challenging than ever to navigate and graduate students and postdoctoral researchers need to find external sources of support. As it has always been, our success depends largely on our efforts and the choices we make. But success cannot be guaranteed only by our own efforts, our circumstances play a critical role in how our efforts are realized. The most critical circumstance is our advisor and the institution we work for so these choices are perhaps our most critical ones. Trainee organizations, like that supported by the SRS, offer platforms such as the TraineeNet email distribution list to discuss common concerns and to gain advice from those who are now experiencing what you think you would like to experience. Graduate students should join their union if they have one and work to help build a union at their university if it doesn't yet exist. Postdocs should be aware of the guidelines that are emerging as national standards for advanced training and should be sure to seek mentors and institutions that will support their needs in an increasingly complex scientific world.

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1. For a review of the current state of doctoral training in life sciences and their job prospects read the National Research Council Report - Trends in the Early Careers of Life Scientists, September 1998, (http://www.nap.edu/html/trends/)
2. To learn about the history and current circumstance of graduate student unions read Graduate Student Radicalism (http://www.theaha.org/perspectives/issues/1999/9911/9911gra1.cfm)
3. To learn which universities have graduate student unions and which are working to gain them read the Coalition of Graduate Employee Unions Contact List (http://www.cgeu.org/contacts.html)
4. To see how one university has interpreted recent recommendations regarding postdoctoral training read the Guidelines for Postdoctoral Appointments, Training, and Education at the University of Pennsylvania Medical School (http://www.med.upenn.edu/postdoc/guidelines/index.htm)
5. To see the variety of career development resources suggested by the University of Pennsylvania Medical School's Office of Postdoctoral Affairs visit their web page (http://www.med.upenn.edu/postdoc/career_dev.html)
6. To join the TraineeNet email distribution list write to your SRS trainee representative at smdoran@mail.med.upenn.edu

Sleep Research Society Awards 2002

The SRS Awards committee is pleased to call for nominations for the SRS Distinguished Scientist Award and the SRS Young Investigator Award.

SRS Distinguished Scientist Award

This is the Society's highest award for scientific advances in the field of sleep research. The award is given for significant, original and sustained contributions of a basic, clinical or theoretical nature.

Members of the Sleep Research Society are invited to submit nominations to the Awards Committee. A letter outlining the scientific contributions made by the nominee and the reasons why the individual should be honored should accompany the nomination. Candidates need not be current members of the Sleep Research Society.

Nominations will be reviewed, and the SRS Awards Committee, which may also offer nominations of its own, will make the Award. Deadline receipt for nominations is Monday, October 1, 2001.

SRS Young Investigator Award

This award recognizes an outstanding research effort by a new investigator in the field of sleep research. The basis for evaluation of candidates is a single publication in a refereed journal; the candidate should be the first author; and the article must be published or officially accepted for publication by the application deadline. On the application deadline, candidate must be 35 years old or younger or within 5 years of obtaining a terminal degree. Exceptions to the age rule will be considered for those applicants who feel that extenuating circumstances warrant such consideration. A letter detailing these considerations must be included with the application.

The award consists of a plaque and a travel honorarium that may be applied toward travel to the 2002 Annual APSS Meeting. The plaque will be presented at a ceremony at the Annual APSS Meeting. To apply, candidates must submit 5 copies of the paper, a single CV, documentation of age (a copy of a driver's license, birth certificate or passport) and, if appropriate, a letter outlining extenuating circumstances regarding the age criterion. If a paper is in press at the time of application, a copy of the written notification of the paper's acceptance for publication must also be included. Applicants should provide the name of a senior investigator who will provide a letter of recommendation. The senior investigator does not need to be an author on the paper or abstract, but should be familiar with the candidate's role on the research project. The candidate is responsible for ensuring that the letter of recommendation from the senior investigator arrives by the application deadline. Last, a candidate must be a member in good standing of the SRS or must include a completed application for membership and fee with the award application. Repeat applications from unsuccessful applicants from previous years are encouraged.

Candidates are welcome to apply for both the Young Investigator Award and the trainee travel fellowship, but in the event the candidate receives the Young Investigator Award, she/he will receive only this award.

The Committee is prepared to provide recognition for multiple awardees. In this way, several outstanding young sleep researchers can be recognized without restriction to just a single "winner." The number of awardees may vary from year to year, depending on the quality of the applications.

Deadline for receipt of Applications is **Friday, March 1, 2002.**

Nominations and Applications should be sent to:

Sleep Research Society, 6301 Bandel Road, Suite 101
Rochester, MN 55901, Attn: Brian Nelson,
Phone: (507) 285-4384, Fax: (507) 287-6008
Email: BNelson@aasmnet.org

American Academy of Sleep Medicine Award

2002

AASM Young Investigator Award

All students and postdoctoral residents and fellows who are under 40 years of age on December 1, 2001 are eligible for consideration in the AASM Young Investigator Award. Scientific merit, innovation, logic and evaluation by the APSS Program Committee's designated reviewers and the Research Committee compose the selection criteria. The top finalist and four honorable mentions will be recognized at the Annual Meeting and will receive honoraria. Please contact the Research Committee at (507) 287-6006 for additional information.

Instructions for application:

1. Indicate on the abstract submission form (via the Internet for electronic submissions or on the attached form for paper submissions of abstracts) your interest in being considered for the AASM Young Investigator Award.
2. Provide your date of birth.
3. Submit your abstract by the applicable deadline.
   November 19, 2001.
4. After determining the semifinalists for this award, the AASM Research Committee will contact the Senior Investigators associated with the works. Final candidates will be selected by the Committee upon confirmation that the nominated project was an original idea produced by the young investigator in an independent manner and that the candidate is under 40 years of age.

Editor-in-Chief, Journal *SLEEP*

The Joint Operations Committee of the Associated Professional Sleep Societies is seeking qualified candidates for editor-in-chief of the journal *SLEEP*. The position of editor-in-chief for the journal *SLEEP* is a five-year appointment with a maximum of two consecutive terms. The current editor has served in the position for the past five years and is eligible for reappointment. All potential candidates must apply for the position following the guidelines listed below.

The successful candidate will hold an MD, PhD or both. Previous research and/or clinical experience in the field of sleep, high academic standing, and international stature are required.

The editor-in-chief will be responsible for ensuring the highest possible scientific and editorial quality of the journal *SLEEP*.

The primary responsibility of the editor-in-chief will be to oversee the scientific content of the journal. Duties will include arranging for submission of papers, selecting competent reviewers to ensure rapid and fair reviews, and making decisions, based on available peer review reports and personal judgment, regarding acceptability for publication, with or without revision. The editor-in-chief will organize other features of the journal, such as commentaries on important manuscripts, editorials, and book reviews. A complete job description is available from the national office.

One page letter of intent required by December 1, 2001. Application packages must be received no later than February 1, 2002 and should include:

Curriculum vita

A letter of application (4-5 pages) including names of proposed associate editors, and outlining the respective roles of editor-in-chief versus associate editors; a vision for the future of *SLEEP* including items such as content, review process, new features, innovations, and serving the readership.

A letter of support from the applicant's institution (chair of department or dean of medical school) ensuring that 25% of your time will be set aside for this function. Compensation in the amount of $50,000 annually will be available.

Interviews will be conducted by the committee, with an expected appointment date of September 1, 2002.

Application packages may be directed to:
Joint Operations Committee
Attn. Jerome A. Barrett
Executive Director
Associated Professional Sleep Societies
6301 Bandel Road, Suite 101
Rochester, MN 55901

Associated Professional Sleep Societies Awards 2002

APSS Trainee Travel Award Program

A limited number of travel awards to help trainees attend the APSS Annual Meeting will be available for the 2002 meeting in Seattle, WA. There are two types of travel awards: awards that are issued on the basis of scientific merit and awards for trainees who have never attended an APSS Annual Meeting. Trainees may apply for only one type of travel award (see instructions below). All eligible applicants must be members of the SRS or AASM (regular or student membership status) and currently engaged in sleep research. These awards are primarily intended to further the career development of students who are actively pursuing an academic degree, or who are in the early stages of post-graduate training in the areas of sleep research and sleep disorders medicine. Eligible trainees include undergraduate students, graduate students, and postdoctoral fellows or medical interns/residents who are within four years of receiving the doctoral degree or completion of medical internship. Trainees who have been accepted but who are not yet enrolled in a college or university degree program are also eligible. The dollar amount of the award to each recipient (not to exceed $500) depends on the type of award. Recipients of the Trainee Research Excellence Award each receive $500. Trainee Research Merit Awards are larger in amount than Trainee Travel Stipends and First Time Trainee Travel Awards. Historically, there are many more Travel Awards Based on Scientific Merit issued than First Time Trainee Travel Awards. Award winners will be notified by email (or fax if email address is not provided) prior to the advanced registration deadline for the APSS Annual Meeting.

Trainee Travel Award Based on Scientific Merit

To be considered for a Trainee Travel Award Based on Scientific Merit, you must be the first author of an abstract. Although the same first author may submit up to two abstracts, only one of the abstracts may be submitted for consideration of this award. Indicate your interest for consideration of a particular abstract by completing the required information on the online submission form or the attached paper submission form. Trainee abstracts will be ranked based on scientific merit regardless of presentation type. The scientific merit of abstracts is recognized at three levels:

- Trainee Research excellence Awards—top 10 trainee abstracts
- Trainee Research Merit Awards— meritorious trainee abstracts
- Trainee Travel Stipends—good abstracts that were not ranked high enough to receive merit or excellence award

Deadline for the Trainee Travel Award Based on Scientific Merit is: **November 19, 2001.**

First Time Trainee Travel Award

Trainees who have never attended an APSS Annual Meeting may apply for a limited number of First Time Trainee Travel Awards. Applicants for this award will not be considered for a Merit-Based Trainees Travel Award. The application for this award must include the following:

1. CV of applicant - should include current mailing address, and email address (preferable) of fax number for the most efficient method of correspondence.
2. A letter from the applicant certifying that she/he has never before attended an APSS Annual Meeting, and a statement expressing how this meeting will be beneficial to her/his career development.
3. A letter from the trainee's mentor or departmental advisor describing the trainee's research involvement, and certification that the applicant is an eligible trainee (as defined above).

Deadline for receipt of First Time Trainee Travel Awards application: **February 1, 2001**

Send complete application to:
First Time Trainee Travel Award, 6301 Bandel Road NW, Suite 10, Rochester, MN 55901, Attn: Brian Nelson

apss 15th ANNUAL MEETING

Drs. Ralph Lydic, Mary Carskadon and David Dinges are recognized for their dedicated work for the SRS in 2000-2001 as President (Dr. Lydic), Past President (Dr. Carskadon) and President-Elect (Dr. Dinges).

Attendees viewed and conversed over many posters displayed for three days during the meeting.

Joseph S. Takahashi, Ph.D., delivers the Keynote Address on "Neurogenetics of Circadian Clocks in Mammals"

CHICAGO, Illinois

June 5-10th, 2001

Drs. David Dinges (Mark O. Hatfield Public Policy Award Recipient), J. Christian Gillin (Nathaniel Kleitman Distinguished Service Award Recipient), and Allan Pack (William C. Dement Academic Achievement Award Recipient) were presented with awards at the Opening Ceremonies

The Sleep Research Society has wrapped up its 10th Annual High School Essay Awards Program for high school students in the general area of sleep. Typewritten essays were limited to 1000 words in length and were accepted on any topic in the general area of sleep and society. The society has awarded over $10,000 to students over the duration of the Essay Contest. Cash awards in the amount of $250 and a certificate of merit were awarded to the five best essays as judged by a panel of experts from the Sleep Research Society. This year's contest had over 270 submissions with 17 states and 28 schools represented.

Cure Could Mean the Big Sleep for Narcolepsy

by Edward Coakley
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Thomas Jefferson High School for Science and Technology
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One of the most mocked but poignantly tragic disorders is narcolepsy. Fortunately, recent discoveries may soon provide a more effective medication or even cure for this illness.

Narcolepsy is characterized by constant daytime sleepiness. A day in the life of those afflicted feels like the end of forty-eight sleepless hours, yet most narcoleptics "tend to sleep poorly at night" (Siegel, 2000). Although they fall asleep quickly, most have fitful sleep at night. Narcoleptics suffer generally unpredictable attacks of instant sleep, usually triggered by emotional excitement (like a funny joke). These tend to last as long as the sleep attacks, but consciousness remains. Dreamlike states while awake called hypnagogic hallucinations are also symptoms. These debilitating effects prevent narcoleptics from performing many vital tasks such as driving and giving them constant fear of a spontaneous sleep attack; enough to make anyone think twice before climbing a ladder or even staircase.

Narcolepsy is "Surprising in its wise range of incidence" (Siegel, 2000). Affecting .03 to.1% of the population (Mignot), an estimated 2,000 in the US have the disorder (Travis, 2000). Populations globally range from one in every 500,000 people in Israel to one in six hundred in Japan. Some animals such as dogs can be narcoleptic as well. Although these animals typically show characteristics from birth and seem to be a recessive gene for the disease (Siegel, 2000), the disorder seems to have more complicated in humans. Most narcoleptic people develop symptoms in adolescence or early twenties and have no relatives with the disorder (Siegel 2000).

Until recently the cause of narcolepsy has been unknown. A French physician named Jean Baptiste Edouard Gelineay first documented the disorder and coined the term "narcolepsy" in 1880. It has long been thought to be due to a problem correctly initiating and maintaining REM Sleep. Thomas Kilduff of SRI International in Menlo Park, California describes the concurrent findings of several researchers last year as "Certainly the most important discovery for Narcolepsy since it original description" (Travis, 2000). Researchers such as Emmanuel Mignot of Stanford University now think they know the cause of narcolepsy.

The first lead came from a research group headed by Jerome M. Siegel of the University of California in Los Angeles. Working with narcoleptic dogs, Siegel's group confirmed that neurons firing in the medial medulla in the brain stem were the causes of the dogs' cataplexies. In the same laboratory Frank Wu discovered that the lack of norepinephrine secretion from the locus coeruleus during REM sleep is partly responsible for the lack of muscle tome. The group concluded that complete loss of muscle tome during REM sleep must be due to the cessation of activity in norepinphrine-containing cells and activation of the medial medulla, inhibiting muscle movement (Siegel, 2000). So why do narcoleptics suddenly experience this during the day?

Mignot's team found a plausible answer. Their narcoleptic dogs have a mutated gene, altering the hypocretin receptor sites of their neurons (Siegel, 2000). This first connected the neurotransmitter hypocretin (or orexin) with Narcolepsy. A subsequent study by Masashi Yanagisawa at Howard Hughes Medical Institute in Dallas showed that genetically altered mice whose neuron are not fired by hypocretin appeared narcoleptic (Yanagisawa, 1999). Researchers reasoned that because hypocretin-producing neurons stem from the lateral hypothalamus to other regions such as the forebrain, the brainstem (affecting the release of acetylcholine, histamine, serotonin, etc.), and the locus coeruleus (described above), such abnormalities could explain the phenomenology of narcolepsy. Further studies by Mignot and his colleagues confirmed this reasoning.

On January 1, 2000 Mignot et.al. published the findings of their research on human narcoleptics. Nine narcoleptics and eight controls had spinal taps between 9:30am and 3:45 pm

on the same day. The spinal fluid of each of the eight controls showed levels of hypocretin-1 while seven of the nice narcoleptics had insufficient quantities of the neurotransmitter for any to be detected (using a Mann Whitney U Test). These seven subjects were narcoleptic due to a malfunction in the production of hypocretin, Rather than just a gene- caused mutation in the receptor sites of the neurotransmitter (Mignot, 2000) However, Mignot suspected the two narcoleptics with hypocretin in their spinal fluids had the receptor site mutation like the dogs. The more common hypocretin production deficiency explains why the disorders is not hereditary in human. The main cause is not a single recessive gene as it was for the narcoleptic dogs (although it may be hereditary caused for some human narcoleptics, such as the two described above.)

All that remained to be found was the cause of the problem in producing hypocretin. Mignot's team proposed a reason for this, hypothesizing that an autoimmune deficiency was causing the destruction of the hypocretin-producing neurons (Mignot, 2000). Brains studied were of deceased narcoleptics who had had the disorder for over 50 years (Morris, 2000). Evidence of autoimmune destruction such as that theorized by Mignot would only be evident at the onset of the disease, while the destruction was taking place. Therefore the brains do not disprove the hypothesis. Brains studied by Siegel et.al. of dogs just at the onset of Narcolepsy (one to two month old) showed "clear evidence that [hypocretin] neurons… were degenerating" by using stains that detected damaged neurons. Christelle Peyron of Mignot's group was unable to find any Hypocretin-producing neurons in the brains of the two deceased narcoleptics, while finding that the brain cells normally intertwined with the hypocretin producing ones were perfectly intact, as would be the case in an autoimmune deficiency (Travis, 2000). Even so further evidence is needed to disprove or confirm this hypothesis.

The meaning of all this research is the probable cause of narcolepsy in humans and most importantly new more effective treatments. Kilduff predicts that drugs imitating the missing hypocretins will be the next step (Travis, 2000). Such treatments for narcolepsy seem very promising.

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Melatonin: Help or Hoax?

by Mandy Dowling
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Melatonin has received a dramatic amount of media coverage over the past few years. Few other medicines or supplements have been debated to this degree. Melatonin is rumored to increase life expectancy, reverse again, strengthen the immune system, and improve one's sex life. It has even been credited with the abilities to cure Alzheimer's and prevent AIDS, slow the growth of tumors and cataracts, and to treat maladies such as autism, schizophrenia and Parkinson's disease (Cardinal). Clinical studies are contradictory and add little to the controversy. Doctors and scientists question what effect, if any, the hormone had on the human body. Professionals only seem to agree on one fact: this hormone has a promising future as a sleep aid.

Melatonin is a hormone produced by the pineal glad in the brain, otherwise know as N-acetyl-% methoxytryptamine. It helps to control the circadian rhythm in the body so that one is able to sleep at night and stay awake during daylight hours. The amount of melatonin produced is controlled by the amount of light that reaches the eye; the less light present, the less melatonin produced by the body, additional melatonin can be taken to help induce sleep. However, melatonin supplements are completely unlike sleeping pill: they do not force sleep, rather they promote sleep (or are soporific) and allow the brain to override the increased feeling of sleepiness created by the hormone if the person so chooses (Buda, 97). Melatonin has been an increasingly popular solution to sleeping difficulties as it causes accelerated sleep initiation, while helping to improve sleep and maintain it.

Supplementing melatonin in the body can help cure insomnia, sleep disorders related to sleep timing, and jet lag (Qlife Melatonin). After the age of forty, the production of the hormone slows and causes the elderly to have an increasingly difficult time falling asleep. (Cardinal) Melatonin has been proven to help insomniacs sleep with out benzodiazepines, a type of strong and sometimes dangerous sleeping pill (Stop Benodiazepines). The hormone is effective in readjusting sleep cycles in night-shift workers, and in aiding the blind to create normal sleep patterns, as they are often unable to maturely produce melatonin with out light trig-

gering its production in their bodies. (Buda, 96, 106) Melatonin is an extremely powerful hormone that, is harnessed, and could prove to be a safer and more effective alternative to many more powerful medications.

Although melatonin has shown promising results in many studies concerning the controlling of sleep patterns, it has not yet become widely accepted in the medical field as an acceptable and safe medication to be used by the general public. The main reason behind this shortcoming is that melatonin products are not regulated by the U.S. Food and Drug Administration (FDA) because they can be found as natural ingredients in some foods, and are naturally produced in the Brain, The FDA claims it will not control the compound unless a study clearly shows that its consumption could be harmful (Beardsley). Because melatonin is not regulated by the FDA, there is no guarantee of the quality of the commercially available supplements: They may contain impurities and are too much, or too little, of the compound than is needed. Health food stores often sell pills that can rise the amount of melatonin in the blood more than ten times higher than normal, which could create serious side effects. In addition, abundant doses of melatonin can cause the boy to secrete a hormone called prolactin, which is known to depress the sex drive in males (Hormone UnProven as Sleep Aid).

Another possible unwanted effect of the hormone could be the disruption of the body's own production of the hormone. In fact, sleep promoting effects have only been found if the patient's melatonin levels are below normal; it is unknown what effect upon the body the presence of an excess of such a powerful hormone may have (Murray, 606). Despite the profusion of prospective positive consequences of the widespread use of melatonin, the larger number of unanswered questions about the quality and adverse effects of the hormone are reasonable values for concern.

The more that is learned about melatonin, the more apparent it is that much more needs to be know about the hormone before it uses can be recommended to the public. Little is know of its long tern side effects, of its reactions with other medication, or its interaction with other diseases in the human body. Until the hormone can be tested and related in an efficient manner, it is unwise for one to take melatonin supplements without professional supervision. While the miraculous cure-all quality of melatonin has been proven false despite multiple mass-media rumors, its impact on the field of sleep disorders is yet to be determined, In this testing phase of melatonin, " results will help scientists to pull back the curtains that have obscured understanding of sleep." Says Judith L. Vaitukaitis, MD of MIT. " They also boost future hope for a natural, non-addictive agent that could improve sleep for millions of American" (MIT Tech Talk)

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Sleep and Learning

by Charles Fleming
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The question, "What is the biological function of sleep?," has been debated by researchers for many years. It is likely that sleep could serve many functions, but it is also possible that it only has one. There are four theories that are most commonly discussed as being the reasons why we and other mammals sleep. They are: Energy conservation, predator avoidance, body restoration, and as a learning aid. However, three recent studies offer converging evidence that one of the main reasons why we need sleep is to consolidate information learned while awake. Which stage of sleep is the most important and how exactly sleep helps our memory.

One test, conducted by Pierre Macquet of University College London, connected REM sleep with strengthening memories of recently learned spatial and visual skills. They used positron emission tomography scanners, which provide an indirect measure of Brain activity, to scan three groups were sleeping, to improve their memories of how to

perform the task. In addition, the researchers identified four areas of the volunteers' brains that became more active during both the task training and their REM sleep. These brain areas have been shown by earlier research to contribute to perception and motor control. Finally, concentrations of acetylcholine were found to surge into the brain during REM sleep. Acetycholine is a neurotransmitter that aids memory formation, and reactivates the part of the brain used inn performing a recently learned task. All of these results show that memory consolidation may take place during REM sleep.

A Second test performed by Robert Stickgold of Harvard Medical School proved that the first night of sleep after learning to do a task is crucial for memory. Participants in his test who slept on the night after they were trained performed a visual task better the next day, and continued to improve over the next three days. People who were derived of sleep that night did not do better at the task the next day. Even when, over the next two night, they caught up on their sleep, they showed little improvement. These results suggest that the first night of sleep is vital for learning a procedural or visual skill.

A Third experiment was performed by Steffen Gais of the Medical University of Lubeck in Germany. He used a visual task very much like that used by Stickgold. Those who trained for one hour in the afternoon, slept for three hours, and then were awakened and tested, had markedly improved performance. The first three hours of sleep are when the brain mostly shows slow waves. Those who were trained after the first three hours of sleep and then tested after they sleep the rest of the night showed no improvement. However, the largest performance boost was exhibited by volunteers who slept the entire night after training. This suggests that REM sleep only amplifies the processes started in the slow wave stage of sleep, and that without slow wave sleep, REM sleep is not helpful in memory consolidation.

The results of these test are not unchallenged, however. Robert P. Vertes of Florida Atlantic University, and Kathleen E. Eastman of Northern Arizona University in particular, dispute these results. In a paper scheduled to be in an upcoming BEHAVIORAL AND BRAIN SCIECES, they point out that when REM Sleep is interrupted by antidepressant medications, memory is not interfered with. Vertes asserts that, in particular, the results of the Maquet experiment might point to corresponding states of vigilance during REM sleep and training, that reflect REM's responsibility for preparing the Brain to wake up. Also, the data from the Stickgold experiment showed memory improvement with only the passage of time, which suggests that sleep might not actually be essential to memory consolidation.

Of the four theories discussed earlier, the one with the best evidence to support it is that at least part of the biological reason for sleep is to consolidate memory. All three of the experiments mentioned here given slightly different view on what part of sleep is the most important, but they all make it clear to sleep and memory have a connection. In order to ensure that memory consolidation really is an important biological function of sleep, further tests should be done, particularly on animals, to make sure that their memory is affected by sleep too. The connection of sleep and memory definitely exists, but exactly how they go together is still unclear. This seems to be a very fruitful field that is worth further investigation, because it could have implication for everyday people. In any case getting a good night's sleep is clearly always a good idea.

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The Function of REM Sleep in Memory Consolidation

by Jason King
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The increasing workload of high school and college students has resulted in the unhealthy habit of sacrificing sleep for homework. In the interest of academic achievement, students who are sleep deprived may actually be damaging themselves, as well as their grades. With part-time jobs and extracurricular activities, most students cannot afford to sleep whenever they feel the need (Black 33). When preparing for an exam, it is not uncommon for a student to stay up late cramming, or even sacrificing all sleep for his/her studies. Recent studies, however, have supported the idea that, while habits such as these may work for short periods of time, sleep deprivation prevents effective encoding of information. Therefore, it is easy to understand why one usually has to relearn old material for a final exam, even though one stayed up all night for the midterm (Fackelmann 2000). This encoding failure can be explained in light of recent research into the function of sleep and its relationship to memory. As the body rests from the day's events, REM sleep plays an important role in the

consolidation of experiences into coherent memories (Stickgold 2000).

For years, it has been speculated that NREM sleep is "the time that the body and brain use to rebuild themselves after a long period of wakefulness" (Miller 1998). REM sleep, however, has been the focus of much scientific inquiry in the past decades because it is less understood. Scientists speculate that REM sleep may be important in the development of the brain and that coordination of eye movements, as well as possibly synthesizing neuron-proteins (Miller 1998). REM Sleep has most recently received attention for its role in the formation of memories. REM sleep is the intermittent period late in the sleep cycle when one has high mental and physical activity, increasing blood pressure and heart rate. REM is frequently associated with dream periods, which may be caused by the REM consolidation activities. Recent events in one's life are thought to be reviewed periodically during REM sleep (Buzaki 2000). In this state, electroencephalograph patterns are very similar to a highly aroused, awake brain. According to Buzsaki (2000), REM sleep may be similar to "explorative activity" in terms of hippocampal processing.

During the 11 to 25 minute REM period of sleep cycle, the brain may be working harder than when one is wide awake (Miller 1998). When a task has been recently learned, the same areas of the brain used during the task will be activated during the subsequent REM sleep period (Stickgold 2000). This activation indicates that the function of REM sleep may encompass rehearsing information learned during the day, replaying the day's events, and consolidating the experiences into a coherent memory (Science 539). Depriving subjects of REM sleep has shown that the memory and improvement of a task are partially dependent on this consolidation. Even without practice, subjects demonstrated improvement in response time when allowed three nights of uninterrupted sleep. Subjects who were deprived the first night, yet allowed to sleep the second and third nights showed no significant improvement, but did demonstrate that there may be a critical period of about 24 hours for effective memory consolidation (Stickgold 2000).

One of the earliest theories to link REM sleep to memory was proposed by Roffwarg, Musio, and Dement, who suggested that the repetitive firing of neurons during REM sleep in fetuses was connected to neuron growth and development, and that this "synaptic reinforcement" continued into adult REM sleep (Miller 1998). This concept developed into the theory of dynamic stabilization, which holds that information, whether inherited or learned, is remembered through repetitive use of the neural pathways that store that information. Dynamic stabilization also proposes that REM sleep activates circuits that are not used during wakefulness, and therefore is key to keeping memories of information that we do not think about during the day, in case we need then in the future (Miller 1998).

The hippocamous may be the key mechanism that allows for REM consolidation, since the hippocampus is already strongly linked with declarative memory. By studying patients with retrograde amnesia, scientists determined that the "replay" of information in the hippocampus leads to more permanent storage in the neocortex (Miller 1998). Slow-wave sleep is another period in the sleep cycle and takes place during the end of the NREM period, and occurs more frequently in the beginning hours of rest. Considered the deepest sleep in the cycle, slow-wave sleep allows information to pass into the neocortex from the hippocampus (Freeman 2000). Due to this function, scientists also believe that the two hours at the beginning of sleep are important for the consolidation of memories as well as the REM-intense hours at the end of sleep.

The link between REM sleep and memory seems to be confirmed by experimental data with animals and with humans. Rat subjects tended to increase their REM periods after learning a new task, suggesting that learning may induce REM sleep. Rats also fell into REM sleep more quickly in proportion to the duration of the learning test. Interestingly, when an audible tone was presented solely during the REM sleep after learning a task, the same tone applied when the rats were awake elicited the learned behavior (Miller 1998). Data from experiment using humans agrees with the animal findings in that subjects performed poorly on recall tests or logical tasks when they were deprived of sleep the first night.

Information is kept in our memories through consolidation during REM sleep. Slow-wave sleep, or stages 3 and 4 of NREM sleep, also contributes to the transfer of information from the hippocampus to the neocortex, while REM sleep replays the day's events. The pressures of school are forcing some students to sacrifice sleep for homework, which, will often result in insufficient consolidation of information, and may lead to lower understanding and grades. Perhaps students should study more quickly and enjoy longer rests, so that they can retain what they learn, instead of cramming for the final exam.

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Insomnia and its Correlation to Depression

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People suffering from chronic insomnia should consider being evaluated by a mental health professional to determine whether their insomnia is a symptom of the mental disorder of depression disorders and is considered one of the most striking symptoms of depression. (Beck, 204-205) Because of the strong correlation between insomnia and depression, mental health professionals warn primary health care providers that generally insomnia "should mot be considered a diagnosis in itself but rather the symptom of another underlying disorder." (Anderson, 5)

Insomnia is one of the most common complaints that patients bring to their primary health care providers. (Anderson, 5). Over 3 million patients per year visit a physician complaining of insomnia. (Skaer, 161) A study of patients visiting their doctor complaining of insomnia revealed that only 18.8 percent were diagnosed with insomnia and that 57.4 percent were instead diagnosed with a non-sleep related mental disorder. The most common mental disorder diagnosed was depression, which was diagnosed in 31.7 percent of the patients. (Skaer, 164)

The disturbance of sleep pattern is one of the most common and easily detached symptoms of depression. The majority of depressed patients have some form of sleep disturbance including problem in falling asleep, restless sleep, and early morning waking. (Beck, 204) Among patients with depression, 85% report insomnia. (Clinical Frontiers) Depressive disorders are characterized by a reversal or distortion of general accepted principles of human nature such as the "survival instinct," the "pleasure principle," the "maternal instinct," sexual drives, the need to eat, and the need to sleep. (Beck, 20) Patients with depressive disorders typically sleep less than normal when undergoing an episode of depression. (Beck, 205) Generally, when the depression lifts, the patient regains his normal sleeping pattern. However, insomnia is for many patients with a depressive disorder, the first sign of a recurrence of depression. (Anderson, 5)

Not only is insomnia a sign of the onset of a current episode of depression, but it may also be an indicator of depression, which may occur later in life. A study that followed a group of medical students showed that those students who said that they had problems sleeping when first surveyed were twice as likely to be diagnosed with depressive disorders up to 30 years later as compared to their peers who had indicated no trouble falling asleep in the initial survey. (Chang) The study included 1,053 medical students enrolled between 1948 and 1964 at Johns Hopkins University who were surveyed again in 1988. Overall, 13% reported having chronic insomnia and 68% reported having occasional episodes of insomnia usually associated with periods of stress when first questioned. None of other the students considered themselves as suffering from depression at this time. The 1988 survey of 695 of these former students found that 12.2 % were clinically depressed and 13 of them had committed suicide. The student who had reported themselves as having chronic insomnia as students were twice as likely to have depression in mid-life compared with those who had not originally reported insomnia. The risk of later depression was also greater among those who reported themselves as having occasional episodes of insomnia as compared to those who reported no insomnia at all during medical school. According to Chang:

Of the characteristics assessed, self-reported insomnia and difficulty sleeping under stress appear to be of greatest potential importance. It is unlikely that either sleep complaint was acting merely as a symptom of depression in medical school because these sleep disturbances in young adulthood predicted the development of depression more than 20 years later, independent of other potential risk factors such as family history, age, temperament type, and tobacco and alcohol use (Chang, 110)

The link between insomnia and depression is supported by biological abnormalities in the sleep cycle of patients with depressive disorders. Electroencephalograph studies of the brain waves of patients with depression show that their sleep cycle is not normal. Depression has been linked to a shortened period for the onset of the REM (rapid eye movement) phase of sleep. (Beitman, 123) In a normal sleep pat-

tern, it takes about 90 minutes before the sleeper starts the REM phase of sleep. In the sleep pattern of a person with depressive disorder this period before the onset of REM sleep may be reduced to a few minutes (Anderson, 5) The disruption of the sleep cycles may in part explain why patients with depressive disorder complain of insomnia. In other words, patients with depression may feel like they are not getting enough sleep, not only because they do not sleep long enough hours, but also because their sleep cycles are disrupted.

It is critical to understand that correlation between insomnia and depression when determining the proper treatment of patients diagnosed with a depressive disorder that exhibits symptoms of insomnia. The proper treatment may include pharmacotherapy, or the use of drugs. Certain antidepressant drugs may help to alleviate the depression, as well as the insomnia. These drugs regulate the levels of serotonin reuptake inhibitors (SSRIs) and monoamine oxidase inhibitors (MAOIs). (Majeroni, 131; National Institute of Mental Health, 11-13) Both nefazodone and mirtazapine are considered effective drugs to treat insomnia such as sedatives or tranquilizers should be prescribed to patients with depressive disorders with care because of their tendency to aggravate depression. (Anderson, 6)

Not only pharmacotherapy, but also cognitive techniques may be used to treat insomnia related to depressive disorders. (Beck, 205) The patients should be counseled to become more active during the day, so that he or she will sleep better at night. . The patient should be taught how to relax through relaxation methods such as deep breathing exercises and visualization methods, The therapist should also correct misconceptions and stress associated with insomnia. It may be beneficial to let the patients know that she is probably sleeping more than she thinks and that lost sleep is not catastrophe. (Beck, 205)

Although the loss of a few nights' sleep may not seem like a serious mental health problem, chronic insomnia should be treated seriously. Chronic insomnia is highly correlated with depressive disorders. Often insomnia is the most striking symptom of depression. As a result, people with chronic insomnia should consider being evaluated by a mental health professional experienced in diagnosing and treating depressive disorders.

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Announcements

STUDY OF SLEEP ARCHIVES—Pioneers in sleep research have retired and are retiring apace. Papers and items of interest relative to early sleep research would be welcomed in the Association for the Psychophysiological Study of Sleep Archives. Address: Department of Special Collections, University of Chicago, 1100 E 57th Street, Chicago, Ill 60637

BIOINFORMATICS IN NEUROSCIENCE AND SLEEP RESEARCH

A workshop on "Bioinformatics in Neuroscience and Sleep Research" jointly sponsored by the American Academy of Sleep Medicine (AASM), the Sleep Research Society (SRS), the National Heart, Lung, and Blood Institute (NHLBI), and the National Center on Sleep Disorders Research (NCSDR), was held on the NIH Campus in Bethesda, Maryland, July 16-17, 2001, and broadcast live on the internet.

The focus of the workshop was to review and assess current bioinformatic approaches and their potential role in advancing biomedical sleep and circadian research. Biomedical informatics is a rapidly evolving field which utilizes computational methodologies to address many areas of scientific inquiry. As research data sets become larger and more complex, the need for such methodologies becomes more acute. These approaches are currently being widely utilized in a variety of areas including genetics, proteomics, systems neuroscience, imaging and clinical research. Enhanced informatic approaches may be needed to analyze temporal changes in gene expression, protein levels (proteomics), and cell function over the varying periods of time found in biological rhythms. Knowledge building strategies are also needed to accelerate the process of integrating the experience and knowledge of researchers working in different model systems and using a variety of clinical and basic approaches. Despite the potential of these approaches, biomedical informatic techniques are not currently used broadly in the sleep and circadian fields and few if any investigators have either formal training or advanced skills in these computational areas. The recognition of both the power of these scientific methods and their limited use in sleep science led to the organization of this workshop.

The two day meeting format was divided between presentations by bioinformatics experts in the areas of clinical, genomic, neurophysiological and imaging research, and discussion sessions led by sleep and circadian researchers. The goal was to identify gaps in knowledge and recommend future research directions and priorities for future bioinformatics research that would improve our understanding of the fundamental mechanisms regulating sleep; the role of sleep in health and disease; and the pathophysiology of sleep disorders.

In brief, the workshop concluded that the field of sleep and its disorders could benefit substantially from the application of bioinformatic techniques. Sleep and circadian rhythms are mediated by diverse neural systems involving numerous neurotransmitters dispersed across much of the brain. Fully understanding the interaction and complexity of systems producing sleep has proved difficult using current methodologies to integrate findings. Informatic methodologies offer the potential to allow broad sharing and analysis of data from numerous sources to answer fundamental questions. Sharing of large polysomnography data sets from numerous laboratories would offer new opportunities to both define normal sleep and to characterize abnormal sleep. Access to databases of neuroimaging and neurogenetic resources will extend the sleep research field into new dimensions. The current complexity of science will demand more interaction between laboratories and diverse scientific approaches if steady progress is to be achieved. Data sharing also has the potential to shift the focus of the intellectual challenge in sleep research to problem solving through rapid access to the most recent discoveries, recognizing the value of this information, integrating these data into new or existing hypothesis and the design of new experiments. Such data sharing will require advanced bioinformatic technologies.

The conference recommendations will be submitted to the journal of the American Academy of Sleep Medicine and Sleep Research Society—*SLEEP*, and presented at the next meeting of the NIH National Sleep Disorders Research Advisory Board. Questions concerning this workshop, can be addressed to Dr. Carl Hunt, Director, NCSDR (E-mail huntc@nhlbi.nih.gov, Phone 301-435-0199)

CONFERENCE ORGANIZERS

Dr. Allan Pack, University of Pennsylvania
Dr. David White, Brigham and Women's Hospital
Dr. Thomas Kilduff, SRI International
Dr. Ronald Harper, University of California, Los Angeles
Dr. Michael Twery, National Heart, Lung, and Blood Institute
Dr. Carl Hunt, National Center on Sleep Disorders Research

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- **Demonstrate aptitude and proficiency in research.**
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To apply or for additional information, contact the:

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E-mail: nsf@sleepfoundation.org
Website: www.sleepfoundation.org

POSITIONS AVAILABLE

POSTDOCTORAL POSITION IN THE DEPARTMENT OF PSYCHIATRY—University of Wisconsin at Madison, 1 postdoctoral position available at the Department of Psychiatry to study the molecular and cellular consequences of sleep deprivation in rats. Experience with EEG recording in animals, as well as strong background in molecular biology, biochemistry, and related field, is preferred. NIH salary scale or better, depending on experience. Send CV and name of 3 references to Dr. Giulio Tononi at gtononi@facstaff.wisc.edu or fax at 608-263 9340.

SENIOR RESEARCH ASSISTANT—University of Wisconsin at Madison, 1 senior research assistant position available at the Department of Psychiatry to study the molecular biology of sleep. Experience with EEG recording in animals is preferred. Strong background in molecular biology is required. Send CV and name of 3 references to Dr. Giulio Tononi at gtononi@facstaff.wisc.edu or fax at 608-263 9340.

POSTDOCTORAL POSITION IN DEPARTMENT OF PSYCHIATRY—University of Wisconsin at Madison, 1 postdoctoral position available at the Department of Psychiatry to study sleep in Drosophila melanogaster. Strong background in genetics and molecular biology is preferred. NIH salary scale or better, depending on experience. Send CV and name of 3 references to Dr. Chiara Cirelli at ccirelli@facstaff.wisc.edu or fax at 608-263 9340.

CLINICAL NEUROSCIENCE (SLEEP AND SUBSTANCE ABUSE) POSTDOCTORAL POSITION AVAILABLE IN NEW YORK CITY—The Laboratory of Neurophysiology of the Department of Psychiatry at Harvard Medical School under the direction of J. Allan Hobson, M.D. is seeking a postdoctoral fellow to work with collaborators in the Department of Psychiatry at the Columbia College of Physicians and Surgeons in New York City. The position is funded by the National Institute on Drug Abuse and is located at the Substance Use Research Center of Columbia University under the direction of Marian Fischman, Ph.D. The study involves the three-way interaction between sleep, cocaine abuse and cognition and utilizes polysomnographic sleep monitoring and neuropsychological testing in a 22-day inpatient simulated binge abstinence protocol with chronic crack cocaine users. Dr. Hobson and members of the Harvard Medical School team will provide mentoring with respect to sleep neurobiology and cognitive neuroscience while the Columbia group will provide training in Clinical Research Center facilities and cocaine self-administration protocols. The individual in this position will need to reside in New York City but be willing to travel to Boston periodically and will participate as a member of both laboratory teams. Interested parties should reply to Edward F. Pace-Schott at 617-626-9475 or edward_schott@hms.harvard.edu.

TERRITORY SALES MANAGER, SLEEP AND NEURODIAGNOSTIC EQUIPMENT—Job Description: A leading company in the manufacturing and marketing of neurodiagnostic equipment is looking for an individual who would be responsible for generating and maintaining sales in their assigned territory. The individual would also be attending trade shows. Excellent salary and compensation package. Minimum Job Requirements: Bachelor's Degree. Expertise in sleep or neurology. At least 1-2 years sales experience. Working knowledge of PC's and their applications. Excellent communication and interpersonal skills. Must be willing and able to travel extensively. Superior technical ability. Contact: Jane Meyers, Dorothy Farnath & Associates, Recruitment Specialists; 856-810-2200; E-mail jmeyers@farnath.com

FACULTY POSITION—HARVARD MEDICAL SCHOOL—The Department of Medicine at the Brigham and Women's Hospital/Harvard Medical School, Boston seeks a full-time faculty member (Assistant/Associate Professor) with demonstrated research excellence in the fields of sleep or circadian rhythm research to direct a human sleep physiology core laboratory investigating circadian sleep-wake physiology, including quantitative analysis of the sleep EEG. Opportunities exist for collaboration with an active research group. Preference will be given to individuals who have demonstrated the ability to obtain grant support for their research. Applicants should have well documented commitment to basic/clinical research. Send statement of interests, full CV, a brief description of research goals and accomplishments, a summary of current and past grant support, names of 3 references and representative reprints of 3-5 original reports to: Dr. Charles A. Czeisler, Ph.D., M.D., Professor of Medicine and Chair, Ad Hoc Sleep/Circadian Faculty Search Committee, Division of Sleep Medicine, Department of Medicine, Harvard Medical School, Brigham and Women's Hospital, 221 Longwood Avenue, Room 438A, Boston, MA 02115. Brigham and Women's Hospital/Harvard Medical School are Equal Opportunity/Affirmative Action Employers actively committed to increasing the diversity of our faculty; women and members of underrepresented minority groups are therefore strongly encouraged to apply.

RESEARCH ASSISTANTS—DIVISION OF SLEEP

MEDICINE OF BRIGHAM AND WOMEN'S HOSPITAL—The Division of Sleep Medicine of Brigham and Women's Hospital is looking for full-time Research Assistants in a fast-paced, state-of-the-art Sleep Laboratory. **Job Description:** Assists in the execution of research protocols for the Circadian/Sleep Cores of the Division of Sleep Medicine, which include administration of polysomnograms, administration of computerized neurobehavioral test, collection of multiple frequent biological specimens, monitoring data collection equipment, and adherence to study protocols **Required Skills:** Bachelors degree in health science, biology-related or behavioral science area. High level of technical knowledge, communication and reasoning skills. Able to function appropriately and with limited supervision under sometimes stressful conditions. Initiative and sound judgment are displayed in unexpected situations. Good interpersonal skills, able to maintain positive working relationships with co-workers and to work cooperatively with peers, able to perform his/her role in a team effort. Good organizational skills and ability to prioritize and manage time efficiently. **Shift:** 40 Hours per week. Rotating shifts and some weekends; **Location:** Brigham & Women's Hospital; **Application:** To apply, please fax your resume, indicating "Research Assistant" to: BL39 at: 617-732-4015

SCIENTIST/PROJECT COORDINATOR, TECHNICAL STAFF—Alertness Solutions is a scientific consulting firm that translates knowledge on sleep, circadian factors, alertness, and performance into practical strategies that improve personal and workplace safety and productivity in our 24-hour society. We seek a dynamic professional experienced in these areas to develop and implement innovative products and services for a wide variety of clients involved in transportation, manufacturing, safety and wellness. Successful candidates require a demonstrated ability to author/develop written content for educational materials, conduct literature reviews, analyze and design workplace schedules and recommendations, create and deliver presentations and coordinate project activities. Minimum qualifications: experience with sleep and circadian research (3+ years), Ph.D. in Psychology or other sleep-related scientific field, research and application experience (at least 3 years), and experience with basic personal computer software packages - Word, Excel, and PowerPoint . Technical management experience, background in client-related industries and strong interpersonal skills a plus. We offer excellent salary and benefits, a professional and friendly work environment in beautiful Silicon Valley and tremendous opportunity for the right individual. Please forward your resume and cover letter to: Alertness Solutions, C/o Director of Operations, 20111 Stevens Creek Blvd., Suite 280, Cupertino, CA 95014, FAX: 408/253-2317,
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FELLOWSHIPS

SLEEP RESEARCH FELLOWSHIP—Emory University Sleep Disorders Center at Wesley Woods Geriatric Hospital offers a two-year NIH-sponsored fellowship starting July 1, 2001 for research involving sleep in aged patients with neurodegenerative disease (AD, PD) and stroke. Position open to Ph.D and/or M.D. with an interest and experience in studying clinical aspects of sleep and chronobiology in aged populations. Interested applicants should send a CV and 3 letters of recommendation to: Donald L. Bliwise, Ph.D., Sleep Disorders Center, Wesley Woods Geriatric Hospital, Emory University Medical Center, 1821 Clifton Road, NE., Atlanta, GA 30329. Emory University is an Affirmative Action/Equal Opportunity Employer.