Mysteries of Sleep:
What Goes Bump in the Night?

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Class Meeting Location: List Art Center 110
Class Meeting Times: 3:15 PM – 6:05 PM (Monday – Friday)
Class Meeting Dates: June 20th – July 8th

Class Description:

We spend a third of our lives asleep. Why would we do this? What function(s) does sleep serve for the body, the brain, or the mind? We will explore one of the unanswered questions of science: what is sleep for? We will examine its nature, its peculiarities and oddities, and what happens if you don't get enough. Join us at the intersection of biology and psychology where the secrets of sleep await.

The nature of sleep and dreams is one of science's long-standing unanswered questions. Every animal examined to date sleeps, yet only in the last half a century or so, have we begun to discover why this is. This course examines the biology, and neuropsychology of sleep and dreams, including a focus on the teenage years. Sleep science is state-of-the-art and ever changing. There is no "textbook" for sleep. Instead, students will have the opportunity to read a collection of the primary scientific literature focusing on sleep and dreams. Small group discussions throughout the course will guide students in how to read and interpret a scientific article--an invaluable skill for college-level science courses. Together with traditional lectures framed from this central theme of sleep and dreams, students will learn to think critically about scientific data and conclusions, and pose their own questions and experimental hypotheses. As the course progresses, students will have the opportunity to complete their own sleep and dream diary, offering the class an opportunity to learn insights from themselves as well as the material. The course culminates with a "sleep outreach" project, where students are tasked with communicating the importance of sleep to their peers and the general public in a creative way that is uniquely theirs. An "outreach expo" on the final day of class allows students to share their creations and educate each other on what they learned in the process so that they may carry the importance of sleep into their future endeavors.

By the end of this course students will be able to communicate:

- Who sleeps? When do they sleep? For how long?
- Is there such a thing as optimal sleep? How can we achieve it?
- What does sleep look like in the body and in the brain?
- What are dreams? Do they have meaning?
- What does sleep do for us, and what happens when we don't get it?
- How does sleep become disordered and how can we treat it?

This course is designed to be accessible to a wide-variety of students. Key concepts in psychology, biology, and neuroscience will be introduced within the context of the material, using the science of sleep and dreams as a framework to scaffold learning. While aimed to a wide audience, an interest in science or medicine as well as previous exposure to high school science classes (particularly biology, chemistry, or psychology) will aid students in more rapidly learning the material.

Class Expectations:

- Come to ***class*** and be ***prepared****!*
- Be ***interested*** and ask ***questions****!*
- Be ***attentive*** and ***respectful****!*
- Be ***responsible*** and ***responsive****!*
- ***Honesty*** and ***accuracy!***

- Have ***fun!***

- ***Sleep well*****!**

Class Structure: Three hours is a LONG time to focus on one task. Moreover, people learn in different ways! Therefore, we will use our class time to learn in a number of ways. Each day will be roughly divided into two segments:

- ***Lecture***: Traditional teaching, but aimed to be interactive and fun!
- ***Group Activities:*** How can we learn this material in a more innovative way?
- ***Journal Club:*** Learn to read science the way scientists do!

Journal Club: Science is not learned just from textbooks and slides. Scientific JOURNAL ARTICLES are the true way to learn how science happens. In order to succeed in college-level science classes, you have to learn how to digest these articles easily! Six times throughout the course we will spend the afternoon going over scientific articles from the primary literature. A helpful form When finished, you will be experts!

The reading for each journal club will be posted in Canvas. A worksheet guiding you through the article will assist in your reading, and we will use these worksheets in class.

Email Rules: Email is a wonderful thing. It allows us to reach our teachers and classmates rapidly. However, it should be used thoughtfully. When sending an email to **ME** or your **CLASSMATES**, it is important to always be respectful. Include a simple subject-line so you make clear your question. Please write in full sentences, not in “text-message” form. Please punctuate appropriately. Please be as clear and brief as possible. Finally, ***Email is not a text-message!*** Please do not expect an immediate response. If you email **ME,** I will do my best to respond to you within **24-hours**. Please respect that time-frame before sending a second email.

Readings: There are four books for this course, available at the Brown Bookstore, written by some of the most esteemed sleep researchers and neuroscientists of our times. The first book, *The 24-Hour Mind*, is a fascinating examination of sleep and psychology in modern society. Try and read this book across the three-week class, little by little bit. The next three books, each a "*Very Short Introduction*" are meant to collectively form a textbook or a "reference" for you to turn to as we progress through the course. They will help you when the material may seem confusing.

1. *The 24-Hour Mind*, by Rosalind D. Cartwright [To be read across the course]
2. *Sleep, A Very Short Introduction*, by Steve Lockley and Russel Foster
3. *Dreams, A Very Short Introduction*, by J. Allan Hobson
4. *The Brain, A Very Short Introduction*, by Michael O'Shea

In addition to these books, journal articles for the seven "Journal Clubs" will be posted online in Canvas.

Sleep Diary: Each day you will be asked to complete a "sleep diary", an easy worksheet tracking your sleep! These will be passed out in class, and will be on-line in Canvas.

Dream Journal: Not all of us remember our dreams, but all of us can! For this class, you are encouraged—but not required—to keep a dream journal. The rules are simple. If you wake up with a dream, don't do anything. Lie in bed for a minute, close your eyes and rehearse the dream to yourself. When you know what it was about, write a short description down, then you can get up! Try this as much as you can.

Final Project: Sleep Outreach Public Service Announcement

You are now sleep educators! It is your job to describe the importance of sleep to the people around you, and to your peers!

In lieu of an exam, this course will ask each of you to produce a "final project" that serves to describe/detail/educate on a sleep topic of your choice. The form you take is up to you, but it should be creative and fun—yet detailed and full of information. Previous students have chosen projects in forms such as: art, music-videos, songs, skits, presentations, pamphlets, short stories, board games, and poetry. You can be as creative as you wish, but you must include key scientific information from at least **5 outside sources**! You are allowed to work in pairs or groups of 3. Deadlines for the project are spread throughout the class.

Example topics include:

- Sleep disorders (e.g., sleep walking, insomnia, apnea)
- Sleep at a certain life stage
- Dreaming
- Healthy sleep tips
- Importance of sleep for memory
- Sleep in different animals::

Week 1: What/How/When is Sleep?	
6/20/2016 Monday	**Lecture:** Introduction to the Course *Key Readings:* **24-Hr Mind Chapter 1:** In the beginning: The early days of sleep research.
	Lecture: Introduction to Sleep: Sleep is not one thing! **Assignment**: Start Sleep Diary
6/21/2016 Tuesday	**Lecture:** The Sleeping Brain: Neuro I Key Readings: **Sleep–Very Short Introduction Chapter 3:** The Sleeping Brain**, Brain–Very Short Introduction**
	Lecture: The Sleeping Brain: Neuro 2 **Assignment**: Project Brain Storm
6/22/2016 Wednesday	**Lecture:** When do we Sleep?: Circadian Rhythms?
	Journal Club 1: Wright KP, McHill AW, Birks BR, Griffin BR, Rusterholz T, Chinoy ED. Entrainment of the human circadian clock to the natural light-dark cycle. *Curr Biol* **23:**1554-1558, 2013.
6/23/2016 Thursday	**Lecture:** Sleep in Adolescence
	Group Activity: Project Planning **Assignment**: Choose Project Topic (Email by **Monday!**)
6/23/2016 Friday	**Lecture:** Sleep in Other Animals **Assignment**: Sleep and Memory Problem Set (Due **Monday**!)

	Journal Club 2: Tobler I, Stalder J. Rest in the scorpion—a sleep-like state? *J Comp Physiol A* **163:**227-235, 1988.
Week 2: Why Sleep?	
6/27/2016 Monday	**Lecture: Sleep to Remember Information!**
	Journal Club 3: Walker MP, Brakefield T, Morgan A, JA Hobson, Stickgold R. Practice then Sleep Makes Perfect: Sleep Dependent Motor Skill Learning. *Neuron* **35**(1):205-11, 2002
6/28/2016 Tuesday	**Lecture:** Sleep to Regulate Emotions! **Key Readings: 24-Hr Mind Chapter 4:** Sleep and dreams in depression.
	Lecture: Sleep Loss and Performance!
6/29/2016 Wednesday	**Lecture:** Sleep Loss and the Body
	Journal Club 4: Spiegel K., Leproult R., Van Cauter E., Impact of sleep debt on metabolic and endocrine function. *The Lancet*. **354**(9188):1435-9. 1999
6/30/2016 Thursday	**Lecture:** *Dreaming: "Old School"* **Key Readings: 24-Hour Mind Chapter 2:** Collecting dreams: Watching the sleeping mind
	Group Work: Project Progress

	Assignment: Project References (Due **Monday**!)
7/1/2016 Friday	**Lecture:** *Dreaming: "New School"* **Key Readings: 24-Hour Mind Chapter 9:** Dreaming and and unconscious; **Chapter 10:** The role of dreams in the 24-hour mind.
	Journal Club 5: Wagner, U., Gais, S., Haider, H., Verleger, R., & Born, J. (2004). Sleep inspires insight. *Nature,* **427(22),** 352-355. **Assignment:** Dream Problem-Solving (Due **Monday**!)
Week 3: Sleep Disorders: What goes bump in the night?	
7/4/2017 Monday	**No Class: Fourth of July**
	Assignment: Keep working on Projects
7/5/2016 Tuesday	**Lecture:** Parasomnias // REM Sleep Behavior Disorder: Acting Out Dreams **Key Readings: 24-Hour Mind Chapter 8**: Warnings from the Land of Nod: Nightmares and REM sleep behavior disorder.
	Lecture: Narcolepsy and Sleep Apnea
7/6/2016 Wednesday	**Lecture:** "I just can't sleep": Insomnia **Key Readings: 24-Hour Mind Chapter 3:** Short sleep and its consequences: insomnia.
	Journal Club 6:

	Edinger, JD, Wohlgemuth, WK, Radtke, RA, Marsh GR, Quillian, RE. Cognitive Behavioral Therapy for the Treatment of Chronic Primary Insomnia: A Randomized Controlled Trial. *JAMA* **285**(14):1856-1864.
7/7/2016 Thursday	**Lecture:** Real World Consequences of Insufficient Sleep/Fatigue Guest Lecture: Cassie J. Hilditch, PhD
	Video: "Sleepless in America"
7/8/2016 Friday	**Lecture: Wrap up!!**
	Project Presentations!!