

BILD 38 -- Winter Quarter 2012

Dementia/Neuroscience/Society

SYLLABUS

**INSTRUCTOR:** Eduardo Macagno  
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822-5702  
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**OFFICE HOURS:** Tue, Thu, 10:00 - 11:30 am

**CLASS MEETINGS:** Center Hall, Room 222  
Tuesday-Thursday, 8:00 AM to 9:20 AM

<b>TAs:</b>	<u>Name</u>	<u>email</u>	<u>Time &amp; Location:</u>
	TBD		W 1-2 pm, Center Hall 220
	TBD		4-5 pm, HSS 1315

**COURSE WEBSITE:** <http://www.biology.ucsd.edu/classes/bild38.WI12/index.shtml>

**username:** bild38wi12  
**password:** 38Winter

**LIBRARY GUIDE WEBSITE:** <http://ucsd.libguides.com/bild38>

## COURSE DESCRIPTION

One goal of this course is to introduce students who are not majoring in biology to key ideas and basic information about **human neuroscience** that provide a basis for understanding the nature of and current treatments for brain diseases classified under the rubric **dementia**. A second key goal is to explore how these diseases seriously impact our **society** at many critical socioeconomic levels. Topics will include the fundamentals of human brain structure and function, the changes underlying development, aging and neural diseases, particularly Alzheimer's but also others, whose prevalence in an aging population is creating an increasingly difficult healthcare load and tremendous social, political, ethical and legal impacts on our society.

Our brains participate in every aspect of our lives, from simple bodily functions to our most abstract thoughts. Our identities are the sum of our stored memories and our interactions with our environments. How do ensembles of brain cells (neurons and glia) working together sense the environment, generate responses and behavior and generally control these processes? We will discuss how networks of neurons function, and how these networks mediate sensation, movement, memory and some other higher functions, and focus on what changes accompanying aging may lead to dementia and how biomedical research is addressing these diseases and their grave consequences.

## EXPECTATIONS

As a course offered by the Division of Biological Sciences, we will emphasize acquiring a general understanding of the biological and medical aspects of the subject while also considering human dementia in its societal context. As a non-majors course, there are no specific course pre-requisites, but enrolled students are expected to have a strong interest in the subject, sufficient to do a significant amount of outside reading on their own and to explore current sources of information regarding dementia research, treatment, consequences and socioeconomic costs. Students will be expected to read and report on current news about dementia, and to carry out a team research project on some related area.

In practical terms, the course will be comprised of (1) a series of introductory lectures and discussions of basic neuroscience, including some presentations by experts on the medical aspects of dementia, followed by (2) a series of presentations and discussions of special research projects by teams of students enrolled in the course. Although the projects will be done in teams, each student will be expected to turn in a written report (8-10 page, double-spaced) of the project in their own words. Students will be able to select which project they prefer to participate in. In addition, students will be expected to email weekly short summaries of news articles related to dementia and their project area. Our aim is to become knowledgeable about the critical importance of this subject to the future of humanity and what our society is doing to ameliorate the consequences.

Active student participation is expected in this course. While some "lecturing" on basic materials will take place, classes will always have at least 15-20 minutes of open

participatory discussion. Moreover, students will be expected to be ready to present a brief summary of a relevant news item they have read in the past week, and to be prepared to raise questions and to be able to discuss the assigned topics.

## DISCUSSION SECTIONS

Attendance to a discussion section is required. Depending on the number of students who sign up, there will be one or more discussion sections. The TAs will discuss and respond to questions on the material covered in class that will be included in the quizzes. Weekly news summaries will also be discussed in sections as well as in class.

## RESEARCH PROJECTS

Groups of 3-5 students will carry out projects as a team, and will be expected to present and discuss their findings in Section prior to the class presentation in the last 1-2 weeks of the course. Each student will be required to hand in a short (9-10 pages, with annotated references) written report on their contribution to the team research project at the end of the course instead of a final exam.

## READINGS

Textbook: **NO specific text required;**

There are many textbooks in the Biomedical Library that cover the scientific and medical contents of this course, but generally in far more detail than I plan to cover them - you may like to consult these if you wish to explore the subject in more depth. An excellent book that is at the appropriate level, but which we will not cover in its entirety and hence I am not requiring, is Memory: From Mind to Molecules, by Larry Squire (who is on the UCSD faculty) and Eric Kandel (who won the Nobel Prize for his work on memory mechanisms). This is a book you might like to own and can get for a good discount on the Web, but I will ask the Library to place it on Reserve.

Papers: A few papers will be assigned for reading prior to some class periods. PDFs will be posted on the class website. These are required reading.

## GRADES

**Grades will be based on:**

- 1. Performance in 2 out of 3 short quizzes (40%)**
- 2. Emailing short news summaries on a weekly basis (20%)**
- 3. Written Project Paper, + participation in group presentation (40%)**

Missed quizzes: The only valid excuse for missing an exam that permits you to request a make-up exam is a medical reason or a family emergency. Appropriate documentation is required. Since only **two** out of the **three** exams count towards your grade, you can miss one of them without penalty.

## CLASS SCHEDULE

DATE	TOPIC
Jan 10	Are we facing a dementia epidemic? Plan for the course; research resources at the UCSD Biomedical Library (KH)*
Jan 12	Types of dementias; symptoms; age of onset of cognitive decline
Jan 17	Ethical issues in the diagnosing and treatment of dementia
Jan 19	AD Patient Interview (MR)*
Jan 24	The human brain: major structures and pathways affected by dementia
Jan 26	Signaling within and between neurons; synapses and circuits
Jan 31	Discussion of current news on dementia; <u>QUIZ # 1 --- On materials covered through January 26</u>
Feb 2	Sensory and motor functions, pathways
Feb 7	Plasticity and learning; motor and non-declarative memory
Feb 9	Declarative memory; conscious and subconscious communication
Feb 14	Development and aging of the brain; normal versus pathological changes
Feb 16	Possible mechanisms of dementia and related neurological diseases (WB)*
Feb 21	Development and testing of new drug treatments; current clinical trials (MR)*
Feb 23	Discussion of current news on dementia; <u>QUIZ # 2 --- On materials covered through Feb 21</u>
Feb 28	Novel types of treatments: enhancing cognitive power, delaying memory loss; do natural products work?
Mar 1	Socioeconomic impacts of dementia; demographics
Mar 6	Social issues: affordable human support systems; design of dementia patient care facilities; funding healthcare for an increasing population with dementia
Mar 8	<u>Student Project Presentations</u>
Mar 13	<u>Student Project Presentations</u>
Mar 15	Final discussion; <u>QUIZ # 3 --- On materials covered through March 13</u>
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Mar 20	<b><u>Final Project Reports Due</u></b>

\* Guest Speakers: Drs. William Mobley and Michael Rafii; Librarian Karen Heskett