

## CONSCIOUSNESS: BUDDHIST AND SCIENTIFIC PERSPECTIVES (L&S 124, CN 31468)

College of Letters and Science, Big Ideas Course (3 units)  
University of California, Berkeley — Spring Semester 2017

The nature of what we call consciousness and the nature of what we call reality are central questions in both science and Buddhism. While the encounter between Buddhism and Western science can be traced back to the 19th-century, it garnered momentum and renown when, thirty years ago, the Dalai Lama suggested that a dialogue between Buddhist practitioners and Western scientists might be of interest and benefit to both the Buddhist and scientific communities. While science and religion are not generally considered to be natural collaborators, the dialogue that ensued has catalyzed new strands of research, most notably in the area of the neuroscience of meditation and emotion. Coming from our two disciplinary perspectives (Buddhist studies and neuroscience), we have found ourselves intrigued, excited, and at the same time critical of the Buddhism/science dialogues. We will, in our own way, carry on this dialogue among ourselves, first by laying the necessary groundwork in our respective fields, and then by exploring areas of convergence and divergence around key themes. The process will include reflection on fundamental epistemological and metaphysical commitments in traditional Buddhist thought and in contemporary science.

The first two-thirds of the semester will present basic concepts and assumptions in the fields of Buddhism, neuroscience, and physics as they relate to the study of mind and consciousness. On the Buddhist side this will entail a look at the fundamental tenets of Buddhism, including Buddhist cosmology, soteriology, and metaphysics; Buddhist philosophy of mind, self, and consciousness; and Buddhist meditation theory. On the science side this will include concepts central to evolutionary biology, chemistry, and physics; nervous-system structure and function; approaches to the relationship between brain physiology and "mind," "self," and "consciousness"; and Western scientific perspectives on the mind-matter relation more generally. The last part of the semester will explore areas of convergence and divergence, returning to such themes as: (1) varying accounts of the emergence of self and mind (both evolutionary and phenomenological perspectives), (2) the problem of free will and determinism, (3) the origins of life and the distinction between sentience and insentience, (4) death, and (5) the meaning of life.

There are two lectures and one discussion section meeting each week.

**Lecture times:** Tuesdays and Thursdays, 2:00 to 3:30 PM – 60 Evans

<b>Instructors:</b>	David Presti Department of Molecular and Cell Biology, and Cognitive Sciences Program  249 Life Sciences Addition (LSA) phone and voicemail: 510-643-2111 presti@berkeley.edu	Robert Sharf East Asian Languages and Cultures, and Group in Buddhist Studies  3121 Dwinelle Hall phone and voicemail: 510-642-6369 rsharf@berkeley.edu
<b>Office hours:</b>	David Presti – 249 LSA Wednesdays: 11:00 to 11:45 AM Thursdays: 11:00 to 11:45 AM	Robert Sharf – 3121 Dwinelle Tuesdays: 3:45 to 5:00 PM
<b>Readings:</b>	The course reader, which contains most of the readings for the course, is available at Krishna Copy Center, 2001 University Ave., Phone (510) 540-5959. Additional readings will be distributed via the class bCourse site.	
<b>GSI</b> s	Zack Beer <a href="mailto:beer@berkeley.edu">beer@berkeley.edu</a> Zim Pickens <a href="mailto:johnpickens@berkeley.edu">johnpickens@berkeley.edu</a>	Office hours: Mon.: 3:30-5:30, 3117 Dwinelle Office hours: Wed.: 1-3, 3117 Dwinelle

The GSIs are here to help you get the most from this class. You are encouraged to get to know and talk with your GSI. Your GSI will see you in weekly discussion section and will also be available to meet with you during weekly office hours. Don't be shy!

**Discussion section times and locations:**

101	Friday 12-1	247 Dwinelle	Zim Pickens
102	Tuesday 9-10	237 Cory	Zim Pickens
103	Monday 11-12	79 Dwinelle	Zack Beer
104	Monday 10-11	179 Stanley	Zack Beer

**Prerequisites:** A desire to learn! There are no University course prerequisites for this class.

**Attendance** at the lectures and in discussion section is **required**. There is no textbook for the course, and much of the material presented in lecture is not available elsewhere. But beyond that, we believe there are important concepts and ideas that are best transmitted in-person. There is more to learning than memorizing facts, particularly in a course such as this one, even if memorizing facts is important. In addition, you will find it impossible to do well on the weekly assignments, quizzes, and exams, if you are missing class.

**Assignments** will consist of weekly readings and short writing assignments. The writing assignments will be one-page essays (1" margins, 10-12 point font, 1.5 to 2 line spacing). In grading the assignments we are looking for three things, namely: (1) clear evidence that you did the assigned reading(s) and are keeping up with lectures; (2) clear evidence that you took time to reflect on the assigned reading(s) and think through your response; (3) the paper, even though it is just a few paragraphs, should be clearly organized and written, free of grammatical mistakes, spelling errors, typos, and so on. Some of the assignments are quite challenging, and *we do not expect you to understand everything you read*. We only expect you to give it a good try. The short assignments must be handed in at the start of the lecture on the day they are due. *These papers are never accepted late*. Should you miss class due to unforeseen, legitimate, and documented circumstances (e.g., a medical emergency), you will be given an alternative makeup assignment.

**Exams and Quizzes** will consist of multiple choice, short-answer, and essay questions, drawing from material in lectures, discussion sections, and required readings. We will distribute lists of key terms and concepts to help you prepare for all quizzes and exams.

**Midterm Exam: Thursday March 9**, during the usual class time and place: 2:00 to 3:30, 60 Evans.

**Final Exam: Monday May 8**, 11:30 AM to 2:30 PM (Exam Group 2). The final exam covers material from the entire semester of lectures and readings.

**Important Note:** *We cannot change the dates and times for these exams, and there are no makeups! Mark your calendars now. If you are unable to accommodate these exam dates, you should not enroll in the class.*

**Grading:** Your grade in this class is based on in-class quizzes and writing assignments (50%), exam performance (midterm exam: 15%; final exam: 25%), and discussion section attendance and performance (10%). Your letter grade in the course will reflect your acquisition of knowledge and understanding of the material, and the time and effort you put into the course. Importantly, you will not be competing against fellow students—we do not curve letter grades to conform to a predetermined distribution. If everyone does well, everyone could receive good grade. If everyone does poorly, then everyone could get a poor grade. Rather than devoting energy to worrying about where grade cut-offs are, if you are truly interested in this subject and in getting the most from this class, we urge you to engage seriously from the beginning, keep up with the readings and assignments, come to all lectures and sections, and immerse yourself in the material. You will be rewarded with an understanding of some really fascinating topics. Good grades will be a natural side effect.

**University holidays:** no discussion sections or lectures on these days:

Monday, February 20 – Presidents Day

Monday, March 27 to Friday, March 31 – Spring Recess

**Honor Code:** The student community at UC Berkeley has adopted the following Honor Code:

“As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.”  
The hope and expectation is that you will adhere to this code.

**Use of Electronics in Class:** The use of laptop computers in class is not allowed. The *only* exception is for note taking, and only if you sit in the *first row* (or, if necessary, the first two rows) of the classroom. No exceptions! Cell phones must be turned off at the start of class. No texting!

**Collaboration and Independence:** Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, unless otherwise instructed, homework assignments are to be completed independently and materials submitted as homework should be the result of one’s own independent work.

**Academic Integrity:** There is a zero-tolerance policy toward plagiarism or any other form of academic dishonesty in this course. This means that anyone found taking credit for work that is not his or her own, or cheating in any other way, will receive a failing grade for the entire course. Note that ignorance of the policy is not considered a mitigating circumstance, so if you have any question about what counts as plagiarism or how to properly attribute sources, speak with one of the GSIs or instructors. For additional information on plagiarism and how to avoid it, see: <http://gsi.berkeley.edu/teachingguide/misconduct/prevent-plag.html>

**Communication and E-mails:** We like teaching this class—the material is quite amazing. We enjoy being available during office hours and after lectures to answer questions and further discuss the material. We greatly prefer in-person contact to email. We are available in office hours and following lectures for brief questions and discussion. Questions of importance or ones that require detailed answers must be addressed in person. Always be sure to see us in person about important issues. For example, it is not an acceptable excuse to say something like: “Well, I sent you an email and never heard back.” E-mail is a wonderful tool and very convenient, but it is not a substitute for direct personal contact, especially when such contact is easy, as it is with us.

Thanks again for your interest in this subject. We hope you have a very enjoyable and fulfilling experience in this class this semester!

## Course Schedule: Topics, Readings, Assignments

*Note, this list is tentative and subject to revision. You are responsible for keeping up with changes, which will be announced in lecture and through the bCourse site.*

Reading numbers (#) refer to the list of readings as numbered in the “Table of Contents” in the Course Reader. In the Course Reader, the readings are listed and printed in alphabetical order according to the last name of the first author.

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### Week 1:

Jan 17 Course logistics; What is consciousness?

Jan 19 The "What-it-is-likeness" of Consciousness

Reading: #24 (Nagel 1974)

Videos to watch:

<https://www.youtube.com/watch?v=gZxLUNHEmPw>

<https://www.youtube.com/watch?v=a05kgcI9D2Q>

Videos on the split brain:  
<https://www.youtube.com/watch?v=zx53Zj7EKQE>  
<https://www.youtube.com/watch?v=u9u6cQYcOHw>

**Assignment 1 (due Thursday Jan 19 at beginning of lecture):** Can you find any flaws in Nagel's argument? (Something to think about: what are his assumptions, and how might they be challenged?)

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**Week 2:**

Jan 24            Historical trajectory of physical science.  
Reading: #21 (Kuhn 1962)

**Assignment 2 (due Tuesday Jan 24 at beginning of lecture):** Kuhn's article addresses the issue of predictability in scientific discovery. Reflect on why the discovery of the planet Uranus was not predictable, while the discovery of the planet Neptune was predictable.

Jan 26            Consciousness: terminological issues  
Reading: #3 (Blackmore 2005)

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**Week 3:**

Jan 31            Historical trajectory of biological science  
Reading: #19 (Koshland 2002)

Feb 2            Introduction to Buddhism I  
Reading: #12 (Gethin 1998, Chapters 1 and 2)

**Quiz (on material covered to date).**

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**Week 4:**

Feb 7            Toward a science of consciousness  
Readings: #27 (Pollan 2013); #36 (Cambridge Declaration on Consciousness)

Feb 9            Introduction to Buddhism II  
Reading: #12 (Gethin 1998, Chapter 3)

**Assignment 3:** According to Buddhist understanding, is nirvāṇa something that exists? (Note: we are not asking if Buddhists *believe* in nirvāṇa--they do! But rather, the question concerns how they *understand* nirvāṇa.)

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**Week 5:**

Feb 14 Neuroscience and consciousness  
Readings: #30 (Raichle 2006); #9 (Freeman 2015)

**Assignment 4:** This assignment draws from the readings for 2/7 on "The Intelligent Plant" (Michael Pollan) and 2/14 on "EEG Coherence" (Walter Freeman). In addition, watch the TED Talk by Suzanne Simard (whose research is discussed at the end of the Pollan article) on networking in forests: [https://www.ted.com/talks/suzanne\\_simard\\_how\\_trees\\_talk\\_to\\_each\\_other](https://www.ted.com/talks/suzanne_simard_how_trees_talk_to_each_other)  
If we assume for the moment that our notions of "intelligence," "mind," and "consciousness" are associated somehow with emergence of global processes from underlying component processes, how do Freeman's ideas about EEG coherence compare to communication among plants in a forest? Could a forest have "intelligence," "mind," or "consciousness"?

Feb 16 Buddhist cosmology  
Reading: #12 (Gethin 1998, Chapters 5 and 6)

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**Week 6:**

Feb 21 Expanding a science of consciousness  
Readings: #15 (Hameroff 2006); #11 (Gefter & Hoffman 2016)

Feb 23 Action and causality  
Reading: #26 (Ouspensky 2002)

**Assignment 5:** What (if anything!) can Osokin do to get out of his situation?

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**Week 7:**

Feb 28 Neuroscience and consciousness, continued  
Readings: On bCourses, Presti (2016), from *Foundational Concepts in Neuroscience*

**Assignment 6:** Given what we know about the biology of perception and action (e.g., from readings by Freeman, Presti, etc., as well as from lectures), what are some limitations of the conventional neuroscientific framework? Should these lead you to question your daily experience of the world in any significant way?

March 2 Meditation  
Reading: #12 (Gethin 1998, Chapter 7); #5 (Buddhaghosa 2010); #42 (Young 1982)

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**Week 8:**

March 7 Perception and reality; Exam review  
Reading: #11 (Gefter & Hoffman 2016) (already assigned for Feb 21)

March 9 Midterm Exam

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### Week 9:

March 14            Madhyamaka  
Readings: #8 (Dennett 1981); #10 (Garfield 2009), #17 (*Heart Sutra*)

**Assignment 7:** Based on your careful reading of the chapter by Garfield, how would Nāgārjuna approach the question posed by Dennett, in his essay "Where Am I?". In other words, Dennett is trying to figure out where he *really* is. What would Nāgārjuna say?

March 16            Professor Jeffrey Kripal, Rice University  
Readings: #20 (Kripal & Coyne 2014); on bCourses, Kripal "Super Religion" (2016)

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### Week 10:

March 21            Radical empiricism  
Readings: #13 (Greyson 2012); #4 (Borjigin et al. 2013); #37 (Tucker 2008);  
#38 (Tucker 2016); #6 (Carroll 2016)

**Assignment 8:** The belief of orthodox neuroscience is that mind (or consciousness) is completely a function of the brain and body and cannot be more than that. Using specifics drawn from the readings for Tuesday, discuss whether it is possible (or not possible) to use methods of science to investigate the hypothesis that mind (or consciousness) may in important ways transcend the brain and the body.

March 23            Yogācāra  
Readings: #41 (Waldron 2006); #39 (Varela et al. 1991)

### Spring Recess

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### Week 11:

April 4              Quantum physics and reality I  
Readings: #43 (Zeilinger 2000); #35 (Stapp 1996)  
on bCourses: first two chapters from *Quantum Enigma*, by Rosenblum & Kuttner

April 6              Religion and the Mysticism Debates  
Reading: #31 (Sharf 2000)

**Assignment 9:** Sharf seems to be arguing that the reports of UFO abductees are no more and no less credible than the reports of religious practitioners, meditators, and mystics. Is his argument sound? What sort of evidence or argument might be used to undermine or refute Sharf's position?

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### Week 12:

April 11             Quantum physics and reality II  
Reading: #29 (Radin et al. 2012)

**Assignment 10:** Readings for last week (Stapp 1996, #35) and for this week (Radin et al. 2012, #29) refer to a role of “consciousness” in the quantum measurement problem. How are the intended meanings that Stapp and Radin et al. give this term (“consciousness”) the same, and how are they different?

April 13            Zen  
                      Readings: #16 (Harding 1986); #25 (Nagel 1976); #1 (App 1995)

                      Videos on quantum physics: Bell’s Theorem and Delayed-Choice Quantum Eraser  
<https://www.youtube.com/watch?v=ZuvK-od647c&t=309s>  
<https://www.youtube.com/watch?v=H6HLj4Nt4>

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**Week 13:**

April 18            Psychedelics and non-ordinary states of consciousness  
                      Readings: #28 (Presti 2017); #14 (Griffiths et al. 2006)

April 20            World construction, play and ritual theory  
                      Readings: #2 (Bateson 1972); #40 (Vygotsky 1978)

**Assignment 11:** Bateson and Vygotsky both put forward theories that can be seen as directly linking the symbolic or representational nature of human communication to mind and consciousness. How might their theories be applied to the problem of "observation" or "measurement" seen in quantum physics?

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**Week 14:**

April 25            Steps toward a dialogue with Buddhism  
                      Readings: #6 (Dalai Lama 2005); #18 (Jinpa 2010); #22 (Lopez 2010)

April 27            Buddhism, Science, and Mind

## CONSCIOUSNESS: BUDDHIST AND SCIENTIFIC PERSPECTIVES (L&S 124)

### READER TABLE OF CONTENTS

1. App, Urs. 1995. "On No-Mind" ("Mushinron—Tonkō shutsudo no ichi tekisuto 無心論:敦煌出土の一テキスト"). *Zenbunka kenkyūjo kiyō* 21: 32-69.
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4. Borjigin, Jimo, et al. 2013. "Surge of Neurophysiological Coherence and Connectivity in the Dying Brain." *Proceedings of the National Academy of Sciences USA* 110: 14432-14437.
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11. Gefter, Amanda, and Hoffman, Donald D. 2016. "The Evolutionary Argument Against Reality." *Quanta Magazine*, April 21.
12. Gethin, Rupert. 1998. Selections from *The Foundations of Buddhism*. Oxford University Press.
13. Greyson, Bruce. 2012. "Near-death Experiences." *Encyclopedia of Human Behavior*. Elsevier.
14. Griffiths, R. R., Richards, W. A., McCann, U., and Jesse, R. 2006. "Psilocybin Can Occasion Mystical-Type Experiences Having Substantial and Sustained Personal Meaning and Spiritual Significance." *Psychopharmacology* 187: 268-283.
15. Hameroff, Stuart R. 2006. "The Entwined Mysteries of Anesthesia and Consciousness." *Anesthesiology* 105: 400-412.
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17. "The Heart of the Perfection of Wisdom Scripture."
18. Jinpa, Thupten. 2010. "Buddhism and Science: How Far Can the Dialogue Proceed?" *Zygon* 45: 871-882.
19. Koshland, Daniel. E. Jr. 2002. "The Seven Pillars of Life." *Science* 295: 2215-2216.

20. Kripal, Jeffrey. J., and Coyne, J. 2014. "Visions of the Impossible (an Exchange)." *The Chronicle of Higher Education* (March 31); *New Republic* (April 3); *The Chronicle of Higher Education* (April 8).
21. Kuhn, Thomas S. 1962. "Historical Structure of Scientific Discovery." *Science* 136: 760-764.
22. Lopez, Donald S., Jr. 2010. "The Future of the Buddhist Past: A Response to the Readers." *Zygon* 45: 883-896.
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27. Pollan, Michael. 2013. "The Intelligent Plant." *The New Yorker*, December 23.
28. Presti, David E. 2017. "Too Big for a Nobel Prize." *Festschrift for Sasha Shulgin* (in press).
29. Radin, Dean, et al. 2012. "Consciousness and the Double-Slit Interference Pattern: Six Experiments." *Physics Essays* 25: 157-171.
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**Additional readings posted on bCourses website:**

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Presti, David E. 2016. *Foundational Concepts in Neuroscience: A Brain-Mind Odyssey*. New York: W.W. Norton. (Chapter 11 on "Sensory Perception" and Chapter 18 (pp. 217-219) on cortical neuropil neurodynamics).

Rosenblum, Bruce, & Fred Kuttner. 2011. *Quantum Enigma: Physics Encounters Consciousness* (2<sup>nd</sup> Edition). Oxford, UK: Oxford University Press. (1<sup>st</sup> Edition, 2006).