MATT CARTER

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RESEARCH INTERESTS

I am interested in the neural and molecular bases of instinctive, homeostatic behaviors in mammals, such as sleep/wakefulness, food intake, stress/anxiety, and motivation/reward.

CURRENT POSITION

Post-doctoral Fellow, Department of Pyschiatry and Behavioral Sciences, Stanford University
Principal Investigator: Luis de Lecea

(In March 2011 I will begin a new position as a post-doctoral fellow at the University of Washington working with Dr. Richard Palmiter)

EDUCATION

Doctor of Philosophy (Ph.D.), Neurosciences

Stanford University, Stanford, CA 2004-2010
Thesis title: Optogenetic reverse-engineering of brain sleep/wake circuitry
Thesis advisor: Luis de Lecea
Thesis committee: Karl Deisseroth, Emmanuel Mignot, John Huguenard
Laboratory rotations: Bruce Baker, Anne Brunet, Eric Knudsen
GPA: 4.0

Bachelor of Arts (B.A.), Major: Biology, Minor: Chemistry

Whitman College, Walla Walla, WA 1996-2000
Honors in major study, *Magna cum laude*
Senior honors thesis: The effects of abiotic environmental factors on metachrosal circadian rhythms in the spiny lizard, *Sceloporus malachiticus* (Phrynosomatidae)
GPA: 3.81

PUBLICATIONS

Peer-Reviewed Research Articles

Carter ME, Yizhar O, Nguyen H, Chikahisa S, Adamantidis A, Deisseroth K, de Lecea L (2010). Tuning arousal with optogenetic modulation of locus coeruleus neurons. *Nature Neurosci.* 13(12):1526-33

Carter ME, Adamantidis AA, Ohtsu H, Deisseroth K, de Lecea L (2009). Sleep homeostasis modulates Hypocretin-mediated sleep-to-wake transitions. *J Neurosci* 29(35):10939-10949.

Books

Carter ME, Shieh JC (2009). Guide to Research Techniques in Neuroscience. Academic Press (Elsevier), San Diego, CA.

Review Articles and Book Chapters

Carter ME, de Lecea L. Optogenetic dissection of neural circuits *in vivo*. Trends in Molecular Medicine. *In Press.*

Carter ME, de Lecea L (2010). The role of hypocretins in arousal and arousal-related behaviors. *In* Narcolepsy. *In Press*.

Adamantidis AA, **Carter ME**, de Lecea L (2010). Optogenetic deconstruction of sleep-wake circuitry in the brain. *Front Mol Neurosci.* 2:31

Carter ME, de Lecea L (2009). Hyperarousal and post-traumatic stress disorder: a role for the hypocretin system. *In* Shiromani PJ, Keane TM, LeDoux JE (Eds): Post-Traumatic Stress Disorder. Humana Press, New York, NY.

Carter ME, Schaich Borg J, de Lecea L (2009). The brain hypocretins and their receptors: mediators of allostatic arousal. *Curr Opin Neurobiol* 9:39-45.

Carter ME, Brunet A (2007). FOXO transcription factors. *Curr Biol* 17:R113-114.

Recent Presentations

Carter ME, Brill J, Huguenard J, de Lecea L (2010). Optogenetic dissection of functional interactivity between Hypocretin and locus coeruleus neurons. *41st annual meeting of the Society for Neuroscience (SfN),* San Diego, CA *Poster Presentation*

Carter ME, Yizhar O, Nguyen H, Adamantidis AA, Deisseroth K, de Lecea L (2009). Frequency-dependent effects of optogenetic stimulation of noradrenergic neurons in sleep transitions. *48th annual meeting of the American College of Neuropsychopharmacology (ACNP),* Hollywood, Florida. *One of only ten abstracts selected to be prominently featured as a "Voice Poster."*

Carter ME, Yizhar O, Nguyen H, Adamantidis AA, Deisseroth K, de Lecea L (2009). Dowstream effectors of hypocretin neurons: optogenetic investigation of the locus coruleus in sleep and wakefulness. *Can new tools revolutionize understanding of hypothalamic neural circuits?*, Janelia Farm, Ashburn, VA. *Poster presentation.*

Adamantidis AR, Burdakov D, **Carter ME**, Zhang F, Huerta R, Deisseroth K, de Lecea L (2009). Optogenetic probing of hypothalamus modulation of the sleep-wake cycle. *40th annual meeting of the Society for Neuroscience (SfN)*, 277.7/EE19, Chicago, IL. *Poster presentation.*

Carter ME, Yizhar O, Nguyen H, Adamantidis AA, Deisseroth K, de Lecea L (2009). Optogenetic modulation of the locus coeruleus in sleep and wakefulness. *40th annual meeting of the Society for Neuroscience (SfN)*, 686.13/HH16, Chicago, IL. *Poster presentation and invited Sleep and Circadian Rhythms Data Blitz oral presentation.*

Rolls A, Colas D, **Carter ME**, Adamantidis AR, Heller CH, de Lecea L (2009). Hypocretin-mediated optogenetically induced micro-arousals disrupt sleep-dependent memory consolidation. *40th annual meeting of the Society for Neuroscience (SfN)*, 686.2/GG63, Chicago, IL. *Poster presentation.*

Carter ME, Adamantidis AA, Ohtsu H, Deisseroth K, de Lecea L (2009). Sleep homeostasis modulates hypocretin-mediated sleep-to-wake transitions. *23rd annual meeting of the Associated Professional Sleep Societies (APSS)*, Seattle, WA. *Poster presentation.*

Carter ME (2009). A tour of your brain. *Knowledge Leadership Forum (KLF) annual meeting*, Malibu, CA. *Oral presentation (invited).*

TEACHING

Neurobiology 206: The Nervous System (Stanford University)

- Served as a laboratory TA for 1 quarter, teaching 16 graduate students fundamental human neuroanatomy with human brain specimens
- Served as "Head TA" for 3 quarters (over three years), teaching 120 graduate and medical students fundamental neuroanatomy while directly supervising and training 12 laboratory TAs
- Prepared and presented several hour-long lectures in neuroanatomy; prepared, administered, and graded neuroanatomy exams; rewrote and edited a 136-page course reader on neuroanatomy

Neurobiology 227: Understanding Techniques in Neuroscience (Stanford University)

- Co-created this 9-week course with a fellow graduate student
- Served as an instructor for 4 quarters (over four years), teaching approximately 20-50 students each quarter fundamental techniques used in neuroscience research
- Prepared and presented several hour-long lectures in fundamental neuroscience techniques including whole brain imaging, animal behavior, electrophysiology, imaging neural structure and function, recombinant DNA technology, genetic screens, manipulating genomes and creating transgenic organisms, gene delivery strategies, RNAi, cell culture, and biochemistry assays
- Wrote a 110-page course reader that served as a model for a future book publication

AWARDS

- Excellence in Service to Graduate Students, Stanford University School of Medicine (2010)
- "Best Scientific Poster," Stanford Institute for Neuro-innovation and Translational Neurosciences (2009)
- Walter J. Gores Award for Excellence in Teaching, Stanford University (university-wide teaching award presented to one graduate student per year) (2008)
- Ruth Kirschstein National Research Service Award (NRSA) (2007)
- Excellence in Teaching Award, Stanford University School of Medicine (2007)
- Excellence in Teaching Award, Stanford University School of Medicine (2006)
- National Science Foundation Graduate Research Fellowship (2005)
- Phi Beta Kappa, National Academic Society (2000)
- Sigma Xi, National Honorary Science Society (2000)
- Eugene Marx Service Award, Whitman College (awarded to one graduating senior per year) (2000)
- Senior Commencement Speaker, Whitman College (2000)
- Washington Scholar, Washington State (awarded to three graduating high school students per legislative district) (1996)