BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
RECTOR, David M.	Associate Professor
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EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of California at Davis	B.S.	1988	Biology
University of California at Los Angeles	Ph.D.	1995	Neuroscience (honors)
Los Alamos National Laboratory (NM)	Postdoc	1997-2000	Biophysics

A. Positions and Honors

Positions and Employment

1983	Digital Design, Stanford University, Stanford, CA
1983 - 1984	Computer Products Center, Belmont, CA (Computer Repair Technician)
1983 - 1989	Life Science Research Assistant (R.L. Ariagno, Supervisor): Department of Pediatrics, Division of Neonatology, Stanford University Medical Center, Stanford, CA
1997 - 2000	Director's Postdoctoral Fellow, Biophysics Group, Los Alamos National Laboratory, Los Alamos, NM
2000 - 2002	Technical Staff Member: Biophysics Group, Los Alamos National Laboratory, Los Alamos, NM
2002 - 2006	Assistant Professor: Department of Veterinary and Comparative Anatomy, Pharmacology, and Physiology (VCAPP), College of Veterinary Medicine, Washington State University, Pullman, WA
2006 - present	Associate Professor: Department of VCAPP, Washington State University, Pullman

Honors

1988	President's Undergraduate Fellowship, UC Davis
1989	Dean's Scholarship, UCLA
1990	Predoctoral Fellowship, Honorable Mention, National Science Foundation
1993	World Federation of Sleep Research Societies, Travel Award
1993	Samuel Eiduson Lectureship Award, UCLA
1994	Van Harreveld Outstanding Student Nomination, American Physiological Society
1995 - 1996	NIDRE DE-07212, Training Program Fellowship in Oral-Facial Motor Control
1997	Los Alamos Director's Postdoctoral Fellowship Award (1997);
2002	Invited Speaker, OSA Biomedical Meeting (2002)

Professional Memberships

Faculty for Undergraduate Neuroscience
Sleep Research Society
Society for Neuroscience
Optical Society of America

B. Selected Peer-Reviewed Publications (in chronological order)

Rector, D.M., and R.M. Harper. 1991. Imaging of hippocampal neural activity in freely behaving animals. *Behav. Brain Res.* 42: 143-149.

Rector, D.M., D. Gozal, H.V. Forster, P.J. Ohtake, L.G. Pan, T.F. Lowry,, and R.M. Harper. 1994. Ventral medullary surface activity during sleep-waking and anesthetic states in goats. *Am. J. Physiol.* 267: R1154-R1160.

Rector, D.M., G.R. Poe, and R.M. Harper. 1993. Imaging of hippocampal and neocortical neural activity following intravenous cocaine administration in freely behaving animals. *Neuroscience* 54(3): 633-641.

Rector, D.M., P. Burk, and R.M. Harper. 1993. A data acquisition system for long-term monitoring of physiological and video signals. *Electroencephal. Clin. Neurophysiol.* 87: 380-384.

Poe, G.R., **D.M. Rector**, and R.M. Harper. 1994. Hippocampal reflected optical patterns during sleep and waking states in the freely moving cat. *J. Neurosci.* 14(5): 2933-2942.

Rector, D.M., G.R. Poe, M.P. Kristensen, and R.M. Harper. 1995. Imaging the dorsal hippocampus: light reflectance relationships to electroencephalographic patterns during sleep. *Brain Res.* 696: 151-160.

Poe, G.R., D.A. Nitz, **D.M. Rector**, M.P. Kristensen, and R.M. Harper. 1996. Concurrent reflectance imaging and microdialysis in the freely behaving cat. *J. Neurosci. Meth.* 65: 143-149.

Mayhew, J.E.W., S. Askew, Y. Zheng, J. Porrill, G.W.M. Westby, P. Redgrave, **D.M. Rector**, and R.M. Harper. 1996. Cerebral vasomotion: 0.1 Hz oscillation in reflectance imaging of neural activity. *NeuroImage* 4: 183-193.

Rector, D.M. 1996. Getting started with Xilinx EPLDs – Part 3: Hands-On Project – Implementation. *Circuit Cellar INK* 76: 48-56.

Rector, D.M., G.P. Poe, M.P. Kristensen, and R.M. Harper. 1997. Light scattering changes follow evoked potentials from hippocampal Schaeffer's collateral stimulation. *J. Neurophysiol.* 78: 1707-1713.

Rector, D.M., and R.M. Harper. 1997. A simple miniature CCD video camera for high-sensitivity measurements in freely behaving animals. *J. Neurosci. Meth.* 78: 85-91.

Harper, R.M., C.A. Richard, and **D.M. Rector**. 1999. Physiological and ventral medullary surface activity during hypovolemia. *Neuroscience* 94(2): 579-586.

Rector, D.M., R.F. Rogers, and J.S. George. 1999. A focusing image probe for assessing neural activity *in vivo*. *J. Neurosci. Meth.* 91: 135-145.

Rector, D.M., C.A. Richard, R.J. Staba, and R.M. Harper. 2000. Sleep states alter ventral medullary surface responses to blood pressure challenges. *Am. J. Physiol.* (*Regul. Integr. Comp. Physiol.)*, 278(4): R1090-R1098.

Rector, D.M., R.F. Rogers, J.S. Schwaber, R.M. Harper, and J.S. George. 2001. Scattered light imaging *in vivo* tracks fast and slow processes of neurophysiological activation. *NeuroImage* 14: 977-994.

Rector, D.M., and J.S. George. 2001. Continuous image and electrophysiological recording with real time processing and control. *Methods* 25(2): 151-163.

Poe, G.R., **D.M. Rector**, and R.M. Harper. 2003. State-dependent columnar organization of dorsal hippocampal activity in the freely-behaving cat. *Behav. Brain Res*. 138: 107-112.

Rector, D.M., D.M. Ranken, and J.S. George. 2003. High-performance confocal system for microscopic or endoscopic applications. *Methods* 30(1): 16-27.

Carter, K.M., J.S. George, and **D.M. Rector**. 2004. Simultaneous birefringence and scattered light measurements reveal anatomical features in isolated crustacean nerve. *J. Neurosci. Meth.* 135: 9-16.

Guo, H., C.L. Champion, **D.M. Rector**, and G.S. LaRue. 2004. A low-power low-noise sensor IC. IEEE Microelectronics and Electron Devices Workshop *Proceedings*, April 16, pp. 60-63.

Foust, A.J., R.M. Beiu, and **D.M. Rector**. 2005. Optimized birefringence changes during isolated nerve activation. *Appl. Optics*. 44(11), 2008-2012.

Rector, D.M., K.M. Carter, P.L. Volegov, and J.S. George. 2005. Spatio-temporal mapping of rat whisker barrels with fast scattered light signals. *NeuroImage* 26(2), 619-627

Rector D.M., I.A. Topchiy, K.M. Carter, and M.J. Rojas. 2005. Local functional state differences between rat cortical columns. *Brain Res.* 1047(1), 45-55.

Yao X.C., A.J. Foust, **D.M. Rector**, B. Barrowes, and J.S. George . 2005. Cross-polarized reflected light measurement of fast optical responses associated with neural activation. *Biophysical Journal* 88(6), 4170-7.

Hollenberg B.A., C.D. Richards, R. Richards, D.F. Bahr, and **D.M. Rector**. 2006. A MEMS fabricated flexible electrode array for recording surface field potentials. *J. Neurosci. Meth.* 153(1), 147-153.

Rojas, M.J., J.A. Navas, and **D.M. Rector**. 2006. Evoked response potential markers for anesthetic and behavioral states. *Am. J. Physiol.* (*Regul. Integr. Comp. Physiol.)* 291, R189-R196.

Rector, D.M., C.A. Richard, R.M. Harper. 2006. Cerebellar fastigial nuclei activity during blood pressure challenges. *J. Applied Physiology* 101, 549-555.

B. Selected Peer-Reviewed Publications (continued)

Benison, A.M., **Rector D.M.**, Barth D.S. 2007. Hemispheric mapping of secondary somatosensory cortex in the rat. *J. Neurophysiology* 97, 200-207.

Foust A.J., **Rector D.M.** 2007. Optically teasing apart neural swelling and depolarization. *Neuroscience* 145, 887-899.

McCluskey M.D., Sable J.J., Foust A.J., Gratton G., **Rector D.M.** 2007. Recording invertebrate nerve activation with modulated light changes. *Appl. Optics* 46(10), 1866-1871.

C. Research Support

Ongoing Research Support

NIH / NIMH – R01 MH60623 D.M. Rector (PI) 07/01/01-06/30/10

"Advanced Optical Image Probe for Neurophysiology"

The major goal(s) of this project are to: 1) improve the image probe design for high sensitivity to small and rapid changes in light scattering; 2) implement hardware and software improvements to the data acquisition system; and, 3) to apply the device to investigate the nature and origin of optical changes.

Role: Principal Investigator; Effort: 25%

NIH / NINDS – R01 NS025378 J.M. Krueger (PI) 03/01/05-02/28/10

"*Interleukin-1β: A Promoter of Slow Wave Sleep"*

The major goal(s) of this project are to determine activity-dependent expressions of SRSs and to determine sleep-dependency of SRSs expression; examine the molecular network within which SRSs (IL1 and nerve growth factor [NGF]) act and to determine their effects on other SRSs' negative feedback molecules (IL4 & IL10) and downstream effector molecules (nuclear factor κβ and NOS)

Role: Investigator; Effort: 5%

NIH / NIMH – R01 MH071830-01 D.M. Rector (PI) 01/01/06-12/31/10

"Implantable 16-256 channel data system for sleep in mice"

The major goals of this project are to develop an implantable amplifier and digitizer for remote recording of physiology from mice.

Role: Principal Investigator; Effort: 25%

NIH / NIMH – NS31453 J.M. Krueger (PI) 12/01/06-11/30/11

"Sleep regulation and tumor necrosis factor"

The major goals of this project are to determine which TNF receptor is involved in sleep regulation, whether TNF or TNF-alpha mRNA varies in brain with the time of day or after sleep deprivation, and to localize where in the brain sleep-linked changes in TNF occur.

Role: Investigator; Effort: 10%

Aculight Corporation – No project number D.M. Rector (PI) 09/01/06-08/31/07

"Facial and vagus nerve stimulation in rats"

The major goal of this project is to evaluate the transient optical neural stimulation (TONS) for stimulation of the trigeminal and vagus nerves.

Role: Principal Investigator; Effort: 5%

Ongoing Research Support (continued)

NIH / NIMH – R21 DA020125 B. Sorg (PI) 09/30/06-08/31/08
"Cocaine, Electroconvulsive Seizure and Neural Plasticity"
The major goals of this project are to determine the effects of seizure duration and number of days of ECS treatment on reinstatement of cocaine-primed CPP and to optimize the timing of ECS treatment for its ability to suppress reinstatement of cocaine-primed CPP.
Role: Investigator; Effort: 5%

Completed Research Support (completed within the past three years)

Department of Energy (DOE) – Project number not available George (PI) 10/01/00-09/31/04
"Retinal Prosthesis"
The major goal of this project is to apply optical techniques for implementation of retinal prosthesis devices.
Role: Co-Investigator (P.I. J.S. George); Effort: 20%

Sleep Research Society – JDFP 00-1-02 D.M. Rector (PI) 01/01/02-07/31/05
"Chris J. Gillin Junior Faculty Development Award"
The major goal of this project is to establish sleep research laboratories for junior faculty.
Role: Principal Investigator; Effort: 25%

Murdock Foundation – No project number D.M. Rector (PI) 08/18/05-08/17/06
"*Near Infrared Optical Brain Imaging of Sleep"*
The major goal(s) of this project are to develop a NIR/OT system to provide absolute quantification of pre-frontal cortical activation in ambulatory (freely-moving) sleep deprived and sleep restricted volunteers. Because the pre-frontal cortex is an important brain region for performance and decision making, the NIR/OT device will help to understand how pre-frontal cortex activity and metabolism can be used as a marker for subsequent performance and daytime sleepiness.
Role: Principal Investigator; Effort: 0%

Beckman Foundation, Young Investigators Award – No project number D.M. Rector (PI) 03/01/04-02/28/07
"Spatial-Temporal Dynamics of Cortical High-Frequency (200-600 Hz) Oscillations and Their Role in Rat Somatosensory Processing"
The major goal(s) of this project are to: 1) measure standing wave patterns in the rodent sensory cortex; 2) show that behavioral responses can correspond to a given pattern of standing waves; and, 3) simultaneous recording from secondary sensory cortex should show patterns that correlate with standing wave interference patterns generated in primary cortex.
Role: Principal Investigator; Effort: 0%