PLEXON

Neurotechnology Research Systems

FEBRUARY 26, 2014

www.plexon.com

JOVE METHODS VIDEO LIVE, EARLY REGISTRATION ENDS FRIDAY, LAFAYETTE INSTRUMENT PARTNERSHIP

1ST PLEXON/*JOVE* CONTEST WINNER SEES PUBLICATION GO LIVE!

We are thrilled to announce the official publishing last Friday of the winning article from the first Plexon/*JoVE* Publication Grant Contest. The winning publication-complete with a methods video-titled "Automated Visual Cognitive Tasks for Recording Neural Activity Using a Floor Projection Maze" is available online via Open Access at http://www.jove.com/video/51316/automated-visual-cognitive-tasks-for-recording-neural-activity-using.

Plexon and the *Journal of Visualized Experiments* (*JoVE*) partnered early last year to sponsor this first Publication Grant Contest. Researchers from around the world were invited to submit abstracts for unpublished, original work in which Plexon's flagship OmniPlex® Neural Data Acquisition System was used to perform neural recording during the experiment.

Congratulations once again to Jonathan W. Ho from Rebecca D. Burwell's Behavioral Neuroscience of Memory and Attention Lab at Brown University as the first contest winner. Not only did their work require the use of Plexon's OmniPlex System, but they also relied on Plexon's CinePlex® Behavioral Research System as well. Mr. Ho's team included Tara K. Jacobson, Clayton P. Aldern, Amanda L. Liu and Rebecca D. Burwell.

We hope that you will find the publication of real interest and the methods detailed in the video truly helpful. More details regarding the contest, the winning team and the abstract can be found in the recent news release.

EARLY REGISTRATION FOR WORKSHOP ENDS THIS FRIDAY

Workshop dates: March 17-20, 2014

Early registration pricing ends this Friday, February 28, 2014. Join colleagues already registered from as far as Australia, Italy, Switzerland and China.

The 2014 Plexon Neurophysiology and Behavior Workshop marks the fifth year of this amazing event when researchers from all over the globe descend on Dallas for three full days packed with instructions, demonstration and hands-on exercises presented by renowned researchers and Plexon subject matter experts. Each year, the event becomes stronger with last year earning a new high score of 9.4 out of 10.

For more information, email workshop@plexon.com.

PLEXON AND LAFAYETTE ANNOUNCE PARTNERSHIP

While Plexon is most known for its sophisticated, yet easy-to-use data acquisition systems, optogenetics equipment and video recording and analysis product lines, Lafayette Instrument Company is a recognized leader in state-of-the-art testing apparatus and operant chambers. Together, elegant approaches to simultaneously performing neural recording, optogenetic stimulation, video tracking and trial/task facilitation become possible in a highly efficient environment.

The first integrated product offering will consist of the Bussey-Saksida Touch Screen Operant Chamber System with the OmniPlex Neural Data Acquisition System. The combination will offer a unique environment in which scientists can run a variety of operant tasks, animal learning time is dramatically reduced, and high resolution neural recording is synchronized with a shared timing clock. The offering will be available in rat or mouse-specific configurations.

Future product offerings will include the Bussey-Saksida Touch Screen Operant Chamber System integrated with any combination of the following systems: OmniPlex Neural Data Acquisition System, CinePlex Behavior Research System for digital video recording, tracking and behavior analysis, and the PlexBright™ Optogenetic Stimulation System.

The first integrated products will be available shortly. Interested parties should reach out to either company at info@plexon.com or matt@lafayetteinstrument.com for more information.

DID YOU KNOW . . .

In addition to the hardware referencing feature of Plexon headstages and ampflifiers, the OmniPlex Software starting with version 1.10 offers three digital methods of referencing. These can be applied to either the Spike Continuous source (SPKC), the Field Potential source (FP) or both as they are separate sources.

The first method provides selection of a specific channel to use as a reference (subtraction) from a selected set of other channels.
The other two methods combine a selection of multiple channels to form a composite signal which is then subtracted at each sample time from the set. Common Average Referencing (CAR) averages the value of samples across the channels and then subtracts that from the set. Common Median Referencing (CMR) computes the median value across samples and subtracts that from the set. In many cases CMR is more robust in the presence outlier samples and produces a better reference signal.

Please refer to the section on Digital Referencing in the OmniPlex version 1.10 Release Notes for more details. A discussion of these techniques can be found in 1) "Common median referencing for improved action potential detection with multielectrode arrays." *In Engineering in Medicine and Biology Society*, 2009. EMBC 2009. Annual International Conference of the IEEE, pp. 1604-1607. IEEE, 2009, and 2) "Using a common average reference to improve cortical neuron recordings from microelectrode arrays." *Journal of Neurophysiology* 101, no. 3 (2009): 1679.

PLEXBRIGHT LD-1 SINGLE CHANNEL DRIVER USER GUIDE

For users of the PlexBright LD-1 Single Channel Driver, you will appreciate the most recent version of the User Guide now available online on the product page resources tab or the Documentation page under the PlexBright System.

NEW LINKS TO HOT TOPICS ON HOMEPAGE

The Plexon website homepage has been modified to now highlight the most important news to researchers- such as new software releases, product launches, deadlines, and similar. Check out our new scrolling Recent News panel.

NEW PLEXBRIGHT QUOTE REQUEST FORMS

New PlexBright Quote Request Forms specific to your research scenario:

- Freely Behaving Rat and Larger Animals
- Freely Behaving Mouse and Small Animals
- Head-Fixed/ Anesthetized Animals
- *In vitro* Experiments

The forms can be completed electronically and sent to either orders@plexon.com or faxed to +1 (214) 369-1775. A quote will be sent to you shortly thereafter. Forms are located on the Resources tab for any PlexBright product webpage, or on the Documentation page under the PlexBright System.

UPCOMING EVENTS

- **Computational and Systems Neuroscience (Cosyne) 2014**, February 27 – March 2; Salt Lake City, UT, USA
- **2014 Plexon Neurophysiology & Behavior Workshop**, March 17-20; Dallas, TX, USA

RESEARCH SPOTLIGHT

Let us know about your 2014 publication citing Plexon and our equipment, and we will send you a thank you award with a mug and a T-shirt! Send notices, address and T-shirt size to publications@plexon.com.

All articles listed are alphabetical based on first author within two categories: articles published online in electronic-only journals or ahead of print, and articles published in full print.

Recent articles published online in electronic-only journals or ahead of print:

- Belchior, Hindiael, Vítor Lopes-dos-Santos, Adriano BL Tort, and Sidarta Ribeiro. "Increase in Hippocampal Theta Oscillations during Spatial Decision-Making." *Hippocampus* (2014).
- Benhamou, Liora, and Dana Cohen "Electrophysiological characterization of entopeduncular nucleus neurons in anesthetized and freely moving rats." *Frontiers in Systems Neuroscience* 8 (2014):7.
- Dasilva, Miguel, Kenneth L. Grieve, Javier Cudeiro, and Casto Rivadulla. "Anandamide activation of CB1 receptors increases spontaneous bursting and oscillatory activity in the thalamus." *Neuroscience* (2014).
- Fenton, Georgina E., David M. Halliday, Rob Mason, and Carl W. Stevenson. "Medial prefrontal cortex circuit function during retrieval and extinction of associative learning under anesthesia." *Neuroscience* (2014).

• Jin, Xin, Fatuel Tecuapetla, and Rui M. Costa. "Basal ganglia subcircuits distinctively encode the parsing and concatenation of action sequences." *Nature Neuroscience* (2014).

•• Jacobson, T.K., Ho, J.W., Kent, B.W., Yang, F.C., Burwell, R.D. "Automated Visual Cognitive Tasks for Recording Neural Activity Using a Floor Projection Maze." *J. Vis. Exp.* (84), e51316, (2014).

•• Joachimsthaler, Bettina, Michaela Uhlmann, Frank Miller, Günter Ehret, and Simone Kurt. "Quantitative analysis of neuronal response properties in primary and higher-order auditory cortical fields of awake house mice (Mus musculus)." *European Journal of Neuroscience* (2014).

•• Li, Xiaobing, Yao Chen, Reza Lashgari, Yulia Bereshpolova, Harvey A. Swadlow, Barry B. Lee, and Jose Manuel Alonso. "Mixing of Chromatic and Luminance Retinal Signals in Primate Area V1." *Cerebral Cortex* (2014): bhu002.

•• Pancrazio, Joseph J., Kamakshi Gopal, Edward W. Keefer, and Guenter W. Gross. "Botulinum Toxin Suppression of CNS Network Activity In Vitro." *Journal of Toxicology* (2014).

•• Rangel, L. M., A. S. Alexander, J. B. Aimone, J. Wiles, F. H. Gage, A. A. Chiba, and L. K. Quinn. "Temporally selective contextual encoding in the dentate gyrus of the hippocampus." *Nature Communications* 5 (2014).

•• Santos, Lucas M., Ioan Opris, Robert Edward Hampson, Dwayne Godwin, Greg A. Gerhardt, and Sam Deadwyler. "Functional dynamics of primate cortico-striatal networks during volitional movements." *Frontiers in Systems Neuroscience* 8 (2014):27.

•• Shanechi, Maryam M., Rollin C. Hu, and Ziv M. Williams. "A cortical–spinal prosthesis for targeted limb movement in paralysed primate avatars." *Nature Communications* 5 (2014).

•• Van Beek-King, Jessica M., Pamela T. Bhatti, David Blake, Jonathan Crawford, and Brian J. McKinnon. "Silicone-Coated Thin Film Array Cochlear Implantation in a Feline Model." *Otology & Neurotology* 35, no. 1 (2014): e45-e49.

•• Waschkowski, Florian, Stephan Hesse, Anne Christine Rieck, Tibor Lohmann, Claudia Brockmann, Thomas Laube, Norbert Bornfeld et al. "Development of very large electrode arrays for epiretinal stimulation (VLARS)." *BioMedical Engineering Online* 13, no. 1 (2014): 11.

•• Wu, Calvin, Kamakshi V. Gopal, Ernest J. Moore, and Guenter W. Gross. "Antioxidants l-carnitine and d-methionine modulate neuronal activity through GABAergic inhibition." *Journal of Neural Transmission*: 1-11.

•• Zheng, Jing-Jing, Shu-Jing Li, Xiao-Di Zhang, Wan-Ying Miao, Dinghong Zhang, Haishan Yao, and Xiang Yu. "Oxytocin mediates early experience-dependent cross-modal plasticity in the sensory cortices." *Nature Neuroscience* (2014).

Recent articles published in full print:

•• Aivar, Paloma, Manuel Valero, Elisa Bellistri, and Liset Menendez de la Prida. "Extracellular Calcium Controls the Expression of Two Different Forms of Ripple-Like Hippocampal Oscillations." *The Journal of Neuroscience* 34, no. 8 (2014): 2989-3004.

•• Ames, K. Cora, Stephen I. Ryu, and Krishna V. Shenoy. "Neural Dynamics of Reaching following Incorrect or Absent Motor Preparation." *Neuron* 81, no. 2 (2014): 438-451.

•• Bekolay, Trevor, Mark Laubach, and Chris Eliasmith. "A Spiking Neural Integrator Model of the Adaptive Control of Action by the Medial Prefrontal Cortex. " *The Journal of Neuroscience* 34, no. 5 (2014): 1892-1902.

•• Benhamou, Liora, Orli Kehat, and Dana Cohen. "Firing Pattern Characteristics of Tonically Active Neurons in Rat Striatum: Context Dependent or Species Divergent." *The Journal of Neuroscience* 34, no. 6 (2014): 2299-2304.

•• Botelho, Eliã P., Cecília Ceriatte, Juliana GM Soares, Ricardo Gattass, and Mario Fiorani. "Quantification of early stages of cortical reorganization of the topographic map of V1 following retinal lesions in monkeys." *Cerebral Cortex* 24, no. 1 (2014): 1-16.

•• Genovesio, Aldo, Satoshi Tsujimoto, Giulia Navarra, Rossella Falcone, and Steven P. Wise. "Autonomous Encoding of Irrelevant Goals and Outcomes by Prefrontal Cortex Neurons." *The Journal of Neuroscience* 34, no. 5 (2014): 1970 1978.

•• Happel, Max FK, Matthias Deliano, Juliane Handschuh, and Frank W. Ohl. "Dopamine Modulated Recurrent Corticoefferent Feedback in Primary Sensory Cortex Promotes Detection of Behaviorally Relevant Stimuli." *The Journal of Neuroscience* 34, no. 4 (2014): 1234-1247.

•• Islam, Md Kafiul, Amir Rastegarnia, Anh Tuan Nguyen, and Zhi Yang. "Artifact Characterization and Removal for In-Vivo Neural Recording." *Journal of Neuroscience Methods* (2014).

•• Moran, Anan, and Donald B. Katz. "Sensory Cortical Population Dynamics Uniquely Track Behavior across Learning and Extinction." *The Journal of Neuroscience* 34, no. 4 (2014): 1248- 1257.

•• Pan, Xiaochuan, Hongwei Fan, Kosuke Sawa, Ichiro Tsuda, Minoru Tsukada, and Masamichi Sakagami. "Reward Inference by Primate Prefrontal and Striatal Neurons." *The Journal of Neuroscience* 34, no. 4 (2014): 1380-1396.

•• Patterson, Carlyn A., Stephanie C. Wissig, and Adam Kohn. "Adaptation Disrupts Motion Integration in the Primate Dorsal Stream." *Neuron* 81, no. 3 (2014): 674-686.

•• Perrodin, Catherine, Christoph Kayser, Nikos K. Logothetis, and Christopher I. Petkov. "Auditory and Visual Modulation of Temporal Lobe Neurons in Voice-Sensitive and Association Cortices." *The Journal of Neuroscience* 34, no. 7 (2014): 2524 2537.

•• Roy, Arani, Stephen V. Shepherd, and Michael L. Platt. "Reversible inactivation of pSTS suppresses social gaze following in the macaque (Macaca mulatta)." *Social Cognitive and Affective Neuroscience* 9, no. 2 (2014): 209-217.

•• Senn, Verena, Steffen BE Wolff, Cyril Herry, François Grenier, Ingrid Ehrlich, Jan Gründemann, Jonathan P. Fadok, Christian Müller, Johannes J. Letzkus, and Andreas Lüthi. "Long-Range Connectivity Defines Behavioral Specificity of Amygdala Neurons." *Neuron* 81, no. 2 (2014): 428-437.

•• So, Kelvin, Siddharth Dangi, Amy L. Orsborn, Michael C. Gastpar, and Jose M. Carmena. "Subject-specific modulation of local field potential spectral power during brain–machine interface control in primates." *Journal of Neural Engineering* 11, no. 2 (2014): 026002.

•• Sterbing-D'Angelo, Susanne J., and Cynthia F. Moss. "Air Flow Sensing in Bats." *Flow Sensing in Air and Water*, pp. 197-213. Springer Berlin Heidelberg, 2014.

•• Teichert, Tobias, Dian Yu, and Vincent P. Ferrera. "Performance Monitoring in Monkey Frontal Eye Field." *The Journal of Neuroscience* 34, no. 5 (2014): 1657-1671.

•• Thorn, Catherine A., and Ann M. Graybiel. "Differential Entrainment and Learning-Related Dynamics of Spike and Local Field Potential Activity in the Sensorimotor and Associative Striatum." *The Journal of Neuroscience* 34, no. 8 (2014): 2845-2859.