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## NEW LAB EVERY 3 DAYS, OMNIPLEX 1.11, RADIANT 2.0, PLEXBRIGHT STARTER KITS

### A NEW LAB TURNS TO PLEXON EVERY 3 DAYS!

What a year! Welcome to the 120+ new laboratories from 18 countries that relied on Plexon's equipment for the first time in 2013. We are delighted to be such a trusted partner to so many performing amazing and critical research around the globe. Welcome to the Plexon family, and thank you for the confidence you placed in us.

We eagerly await the next opportunity to serve and support these new customers, just as we do our valued, existing customers in the weeks, months and years to come. Just give us a call and let us know what we can do for you!

### EARLY REGISTRATION FOR WORKSHOP ENDS FEBRUARY 28

Workshop dates: March 17-20, 2014

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.

Registration fees have remained flat for the third year in a row, AND this year there is an added discount if a registration is included on a quote for an OmniPlex®, CinePlex® or MAP System that is ordered by February 28, 2014. Registration pricing is as follows:

- **\$850.00: Early Registration with system purchase (see above)**
- **\$900.00: Early Registration (without a system purchase) until February 28, 2014**
- **\$1,100.00: Registration after March 1, 2014**

The Workshop is limited to no more than 40 attendees to ensure maximum hands-on experience. Letters for Visa applications are available. For more information, email [workshop@plexon.com](mailto:workshop@plexon.com).

### OMNIPLEX 1.11 RELEASED

OmniPlex users – stop what you are doing and download OmniPlex 1.11! This release is packed full of new features and performance enhancements including the significant addition of the new Spectral view, timed recording options, robust statistics, t-distribution expectation maximization (TDEM) auto-sorting algorithm and faster processing among other improvements. Importantly, OmniPlex 1.11 now sets the default recording format to PL2.

A simple yet significant change in this new release is that the recording file format now defaults to Plexon's game-changing PL2™ launched last year. The legacy PLX format is still supported; however, it is no longer the default. PL2 is supported by the latest versions of Offline Sorter™ (OFS), NeuroExplorer®, and Plexon's MATLAB® and C/C++ file reading software development kits (SDKs) available online. It is important to make sure that the applications, scripts and other programs which are intended to be used to view and analyze recorded OmniPlex data support are updated to the new PL2-compatible format. If in doubt, contact [support@plexon.com](mailto:support@plexon.com).

OmniPlex 1.11 now also offers a sophisticated, visually rich, new view: the Spectral view. It displays a rolling color-coded spectrogram of the currently selected field potential (FP) channel, plus an animated spectral graph below it. This allows researchers to monitor changes in spectral content, such as increase in energy in a range of frequencies, as a function of time.

The PlexControl program within the OmniPlex Software now provides options for using robust statistics in the determination auto-thresholding and sorting parameters. The primary advantage of robust statistics is that they are more resistant to the effect of outliers. Researchers will typically find that using robust statistics produces a more accurate estimate of the noise distribution, with the presence of spikes having less influence on the auto-thresholding process.

Previous releases of OmniPlex supported a single auto-sorting algorithm, known as valley seeking. Valley seeking is a non-parametric method based on local density measures, and gives very good results in many cases, but it is not always ideal. OmniPlex 1.11 supports an additional auto-sorting algorithm called t-distribution expectation maximization (TDEM). TDEM works on the assumption that the clusters in feature space (each cluster representing the spikes from one neuron) can be modeled as t-distributions, so that the entire set of clusters on each channel is a mixture of t-distributions. The TDEM algorithm solves a global optimization problem to find the set of t-distributions which best fit the observed clusters on each spike channel.

From a purely practical perspective, researchers will likely appreciate that timed recording options are now supported. Timing of the Start, Stop, Pause and Resume commands can be specified.

In addition to the expanded functionality listed above, several existing functions operate significantly faster in release 1.11. These include auto-thresholding, the initial calculation of the PCA projections (and manual PCA recalculation using the PCA button), and Delete All Units on All Channels. These performance improvements will be especially noticeable at high channel counts.

This latest download can be found on the OmniPlex System webpage, and at [www.plexon.com/software-downloads](http://www.plexon.com/software-downloads). For more information regarding these or other improvements, please read the Release Notes contained within the install package.

### **NEW RADIANT™ 2.0 FOR OPTOGENETIC STIMULATION**

Radiant™ and the PlexBright™ 4 Channel Controller are the cornerstones of the PlexBright Optogenetic Stimulation System. Together, they offer unsurpassed control of LEDs and/or lasers over multiple, independent channels. Radiant 2.0's newly enhanced pattern generation functionality allows researchers to quickly define simple to complex output patterns that may be saved and played back repeatedly. Pattern definition can even be performed offline for later use! Further, arbitrary stimulation patterns can be loaded from user defined text files, or the outputs can be controlled directly by the user in manual mode.

Signals may be configured to enable simultaneous control of both LED modules and lasers. With an additional eight digital inputs and 16 digital outputs, Radiant 2.0 and the PlexBright 4 Channel Controller can easily interface with third-party equipment as part of a more elaborate experimental set-up.

For higher volume research experiments, Radiant 2.0 enables the integration of up to four PlexBright 4 Channel Controllers simultaneously operated by a single computer – yielding up to 16 channels of independent output.

It is important to note, Radiant 2.0 now requires a license key to operate. If you currently have any previous version of Radiant operating on your computer, do not download Radiant 2.0 without already having the license key to operate the software. Contact [support@plexon.com](mailto:support@plexon.com) with any questions.

Click for more information about Radiant 2.0 and the PlexBright 4 Channel Controller or email [info@plexon.com](mailto:info@plexon.com).

### **FREE RADIANT 2.0 AND 4 CHANNEL CONTROLLER UPGRADES**

As a demonstration of Plexon's appreciation and good will during the holidays, Plexon offered a complimentary upgrade to Radiant 2.0 AND the most advanced version of the PlexBright 4 Channel Controller hardware for all customers who placed an order for a PlexBright 4 Channel Controller with Radiant in 2013.

Purchasers should have been contacted by now, but if not, please reach out to [support@plexon.com](mailto:support@plexon.com) with any questions about the complimentary upgrade. We trust you will enjoy the remarkably robust control over your optogenetic stimulation experiments that the newest combination of software and hardware will provide.

### **NEW PLEXBRIGHT OPTOGENETIC STIMULATION STARTER KITS**

Introducing PlexBright Optogenetic Stimulation System Starter Kits specific to your experimental set-up – PLUS a 10% discount. Starter Kits have been developed for the following scenarios:

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

There are two Starter Kits for each type of experimental set-up: an Economical starter kit and a Fully Functional starter kit. They both contain the same components with the exception of the optogenetic driver. The Economical Starter Kit includes the PlexBright LD-1 Single Channel LED Driver, while the Fully Functional Starter Kit contains the PlexBright 4 Channel Controller with Radiant software for advanced functionality across multiple independent channels driving LEDs and/or Lasers simultaneously.

For more information on the Starter Kit contents, see the newly posted PlexBright Quote Request Forms for each of the experiment set-ups listed above. Forms can be found on the Resources tab of any PlexBright product webpage, or on the Documentation page under PlexBright.

### DOCUMENTATION – YOU ASKED FOR IT!

In response to requests for more documentation, the Plexon team generated and posted more than 30 new technical documents online in 2013! You asked and we listened . . . and we are not done yet! Watch the website for many more to come.

### GET READY . . . PLEXBRIGHT™/JOVE CONTEST COMING SOON

Calling all labs with PlexBright equipment! We will be running a second Publication Grant Contest in partnership with the *Journal of Visualized Experiments (JoVE)* - this time for research conducted using the PlexBright™ Optogenetic Stimulation System - a \$4,200 value! Watch for more information and begin collecting your data!!

### NEW PLEXBRIGHT QUOTE REQUEST FORMS

To better manage the tidal wave of interest in quotes for the PlexBright Optogenetic Stimulation System products, we have launched 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

They can be completed electronically and sent to either [orders@plexon.com](mailto: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 PlexBright.

### 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 2013 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](mailto: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:

- Best, Matthew D., Kazutaka Takahashi, Zhe Chen, Noah Huh, Kevin A. Brown, and Nicholas G. Hatsopoulos. "Integrating neural spiking and LFP activity to decode kinematics of the arm and hand during unconstrained reach to grasp movements." *In Neural Engineering (NER)*, 2013 6th International IEEE/EMBS Conference on, pp. 1425-1428, IEEE, 2013.
- Cain, Matthew D., Bradly Q. Vo, Alexander V. Kolesnikov, Vladimir J. Kefalov, Susan M. Culican, Daniel Kerschensteiner, and Kendall J. Blumer. "An Allosteric Regulator of R7-RGS Proteins Influences Light-Evoked Activity and Glutamatergic Waves in the Inner Retina." *PLOS one* 8, no. 12 (2013): e82276.
- Delwig, Anton, Sriparna Majumdar, Kelly Ahern, Matthew M. LaVail, Robert Edwards, Thomas S. Hnasko, and David R. Copenhagen. "Glutamatergic Neurotransmission from Melanopsin Retinal Ganglion Cells Is Required for Neonatal Photoaversion but Not Adult Pupillary Light Reflex." *PLOS one* 8, no. 12 (2013): e83974.
- Estrada-Sánchez, Ana María, Scott J. Barton, Courtney L. Burroughs, Amanda R. Doyle, and George V. Rebec. "Dysregulated striatal neuronal processing and impaired motor behavior in mice lacking huntingtin interacting protein 14 (HIP14)." *PLOS one* 8, no. 12 (2013): e84537.
- Kelly, Sean T., Jens Kremkow, Jianzhong Jin, Yushi Wang, Qi Wang, Jose-Manuel Alonso, and Garrett B. Stanley. "The Role of Thalamic Population Synchrony in the Emergence of Cortical Feature Selectivity." *PLOS Computational Biology* 10, no. 1 (2014): e1003418.
- Kim, Brian J., Seth A. Hara, Benny Chen, Jonathan TW Kuo, Curtis Lee, Christian A. Gutierrez, Tuan Hoang, Malancha Gupta, Victor Pikov, and Ellis Meng. "Evaluation of post-fabrication thermoforming process for intracortical Parylene sheath electrode." *In Neural Engineering (NER)*, 2013 6th International IEEE/EMBS Conference on, pp. 379-382. IEEE, 2013.
- Langlois, Dominic, Denis Cousineau, and J. P. Thivierge. "Maximum likelihood estimators for truncated and censored power-law distributions show how neuronal avalanches may be misevaluated." *Physical Review E* 89, no. 1 (2014): 012709. (Volume 89/Issue 1).
- Lee, J., JM Groh. "Different Stimuli, Different Spatial Codes: A Visual Map and an Auditory Rate Code for Oculomotor Space in the Primate Superior Colliculus." *PLOS one* (2014). January 2014/Vol. 9/Issue 1/ e85017
- Mathews, Kiran S., Heather AC Wark, and Richard A. Normann. "Assessment of rat sciatic nerve function following acute implantation of High Density Utah Slanted Electrode Array (25 electrodes/mm<sup>2</sup>) based on neural recordings and evoked muscle activity." *Muscle & Nerve* (2014).

- Orsborn, Amy L., Kelvin So, Siddharth Dangi, and Jose M. Carmena. "Comparison of neural activity during closed-loop control of spike-or LFP-based brain-machine interfaces." In *Neural Engineering (NER)*, 2013 6th International IEEE/EMBS Conference on, pp. 1017-1020. IEEE, 2013.
  - Seki, Yoshimasa, Neal A. Hessler, Kate Xie, and Kazuo Okanoya. "Food rewards modulate the activity of song neurons in Bengalese finches." *European Journal of Neuroscience* (2013).
  - Weiss, Michael S., Jonathan D. Victor, Patricia M. Di Lorenzo, and Patricia M. Di Lorenzo. "Taste coding in the parabrachial nucleus of the pons in awake, freely licking rats, and comparison with the nucleus of the solitary tract." *Journal of Neurophysiology* (2013).
  - Xiao, Lei, Pu-Ming Zhang, Si Wu, and Pei-Ji Liang. "Response dynamics of bullfrog ON-OFF RGCs to different stimulus durations." *Journal of Computational Neuroscience* (2014): 1-12.
  - Yael, Dorin, Dagmar H. Zeef, Daniel Sand, Anan Moran, Donald B. Katz, Dana Cohen, Yasin Temel, and Izhar Bar-Gad. "Haloperidol-induced changes in neuronal activity in the striatum of the freely moving rat." *Frontiers in Systems Neuroscience* Vol. 7, Article 110, Pages 1-11, December 16, 2013.
- Recent articles published in full print:**
- Abolafia, Juan M., Marina Martinez-Garcia, Gustavo Deco, and Maria V. Sanchez-Vives. "Variability and information content in auditory cortex spike trains during an interval discrimination task." *Journal of Neurophysiology* 110, no. 9 (2013): 2163-2174.
  - Blanchard, Tommy C., and Benjamin Y. Hayden. "Neurons in Dorsal Anterior Cingulate Cortex Signal Postdecisional Variables in a Foraging Task." *The Journal of Neuroscience* 34, no. 2 (2014): 646-655.
  - David, François, Joscha T. Schmiedt, Hannah L. Taylor, Gergely Orban, Giuseppe Di Giovanni, Victor N. Uebele, John J. Renger, Régis C. Lambert, Nathalie Leresche, and Vincenzo Crunelli. "Essential Thalamic Contribution to Slow Waves of Natural Sleep." *The Journal of Neuroscience* 33, no. 50 (2013): 19599-19610.
  - Fenton, Georgina E., Amelia K. Pollard, David M. Halliday, Rob Mason, Timothy W. Bredy, and Carl W. Stevenson. "Persistent prelimbic cortex activity contributes to enhanced learned fear expression in females." *Learning & Memory* 21, no. 2 (2014): 55-60.
  - Glickfeld, Lindsey L., Mark H. Histed, and John HR Maunsell. "Mouse Primary Visual Cortex Is Used to Detect Both Orientation and Contrast Changes." *The Journal of Neuroscience* 33, no. 50 (2013): 19416-19422.
  - Histed, Mark H., and John HR Maunsell. "Cortical neural populations can guide behavior by integrating inputs linearly, independent of synchrony." *Proceedings of the National Academy of Sciences* 111, no. 1 (2014): E178-E187.
  - Lee, Joonyeol, and Stephen G. Lisberger. "Gamma Synchrony Predicts Neuron-Neuron Correlations and Correlations with Motor Behavior in Extrastriate Visual Area MT." *The Journal of Neuroscience* 33, no. 50 (2013): 19677-19688.
  - Wang, Chin-An, Susan E. Boehnke, Laurent Itti, and Douglas P. Munoz. "Transient Pupil Response Is Modulated by Contrast-Based Saliency." *The Journal of Neuroscience* 34, no. 2 (2014): 408-417.