PLEXON®

Neurotechnology Research Systems
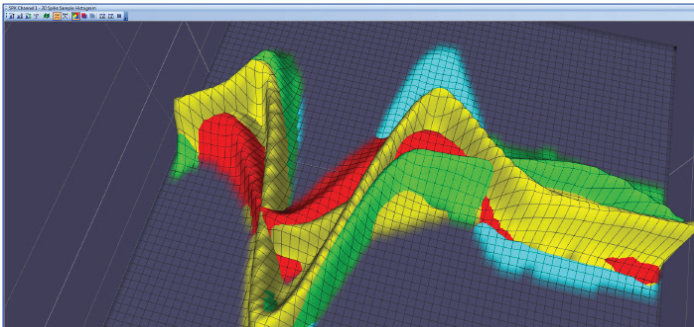
OMNIPLEX 1.13 RELEASED, WORKSHOP SPEAKERS ANNOUNCED, NEW HEADSTAGE & MORE!

OMNIPLEX SOFTWARE 1.13 RELEASED

OmniPlex® Software v1.13 for all configurations of the OmniPlex D Neural Data Acquisition System is now available online. In addition to the software now supporting 512 channels, there are several other improvements including the addition of a Spike Sample Histogram 3D view and channel ranking functionality.

The Spike Sample Histogram 3D view provides an alternative form of visualization for the currently selected spike channel. It displays the same spikes as the standard main spike window, but in a way that models the distribution of spike sample (amplitude) values and the firing rate of each sorted or unsorted unit as one or more solid or semi-transparent 3D surfaces (see screen shot above).

The new channel ranking feature allows the order of display in the multichannel spike, spike-continuous, wideband, and field potential views to be determined by one or more selected criteria. For example, channels can be ranked such that the channel(s) with the largest number of sorted units is/are displayed first. This can help draw your attention to "interesting" channels and reduces display clutter, especially at higher channel counts and/or if you have a significant number of inactive channels.

All OmniPlex Systems with channel counts 128 and greater will benefit from various performance optimizations. Operations such as auto-sort, auto-threshold, and toggling between live data and snapshots are faster and smoother than in previous releases.

PlexControl can also now automatically record multiple PLX or PL2™ files in sequence, based on either a specified file duration, or triggered by a digital or keyboard event.

The Release Notes included in the software download contain more detailed descriptions and examples of the features mentioned above as well as additional functionality, improvements and bug fixes.

This latest download is available for both Windows® 7 and XP platforms, and can be found on the OmniPlex D System webpage along with the updated demonstration version. The downloads are also available at www.plexon.com/software-downloads. For more information regarding these or other improvements, contact info@plexon.com.

ANNOUNCING THE 2015 WORKSHOP GUEST SPEAKERS
April 27-30, 2015

The 6th Annual Plexon Neurophysiology & Behavior Workshop offers over 20 hours of intense, hands-on, exercise-based training during 13 sessions over a period of three days.

Plexon subject matter experts and developers partner with some of the neuroscience community's top labs to deliver unparalleled insight and training. We are thrilled to announce this year's outstanding line-up of honored guest speakers:

•• Neural recording with OmniPlex: **Jonas Thelin**, Lund University, Neuronano Research Center (NRC), Sweden

•• Optogenetics with PlexBright®: **Anders Asp**, University of Minnesota, Department of Neuroscience, USA

•• Video Tracking and Analysis with CinePlex®: **Christian Bravo-Rivera**, University of Puerto Rico School of Medicine, Department of Psychiatry, Puerto Rico, and

•• Specialty probes featuring the U- and V-Probe: **Chandramouli Chandrasekaran**, Stanford University, Neural Prosthetic Systems Lab (NPSL), USA

Each speaker will be sharing their personal experiences using the Plexon equipment in their labs and providing key insights on tips and tricks for the best results.

If you have any questions, please email workshop@plexon.com. We hope to see you there!

WORKSHOP 50% SOLD OUT!!

April 27-30, 2015

The Plexon Annual Workshop is selling out fast. We are already 50% full, leaving only about 20 seats still available. If you are interested in attending this year, please consider completing the registration form as soon as possible. Early registration pricing ends March 31, and don't forget that any lab purchasing a Plexon system qualifies for half price registrations for the first Workshop after the purchase. Lastly, we still have seats open for training on the original MAP Systems, as well.

To help with travel schedules, the program by day, subject and time is now posted on the 2015 Workshop webpage along with the Workshop Flyer and the Workshop Registration Form.

NEXT GEN, 8 CHANNEL HEADSTAGE LAUNCHED

Plexon launches the HST/8o25 GEN 2 headstage, a new and improved 8 channel, analog headstage for use with high impedance electrodes. Compared to its predecessor, this second generation headstage incorporates improved input overvoltage protection, even lower photosensitivity and a better method for mounting LED sockets.

The HST/8o25 GEN 2 headstage is a 0.025" pitch, unity gain headstage available with either a true or grounded reference and in either a nine or ten input pin configuration. It can also be equipped with one or two LEDs for tracking movement. Without the optional LED mounting sockets, the headstage measures 16.3 x 11.8 x 1.5mm (length x width x depth) and weighs less than half a gram.

One improvement in this model includes the addition of series input resistance to protect against overvoltage, specifically 12.5V over the positive power supply or below the negative supply. Researchers requiring long headstage cables will also appreciate the added series resistance to the amplifier outputs to reduce the likelihood of amplifier oscillations. A second ground pad has been added, now offering ground pads on both corners near the connector plug, while further design improvemenets decrease photosensitivity.

Plexon documentation refers to the new 9-pin, HST/8o25 GEN 2 headstage as Headstage C2, and the 10-pin configuration as D2. The Plexon Headstage webpage is a great resource for more information.

PLEXON TO SHARE BOOTH WITH LAFAYETTE AT EXPERIMENTAL BIOLOGY 2015

This April will mark Plexon's first time to exhibit at the Experimental Biology conference. We are thrilled to be participating inside of the Lafayette/Campden Instruments booth where, together, we will highlight the integrated products with our new CineLyzer™ video recording, tracking and analysis system.

We will showcase a fully operational, multi-system, integrated demo system containing the following components:

•• Lafayette Modular Test Chamber for Rats
•• Lafayette Modular Wall Extension with Overhead
•• Lafayette ABET Mini I/O Module Connection Block
•• Lafayette Peristaltic Pump for Liquid Reward
•• Lafayette 45mg Pellet Dispenser for Modular Chambers
•• Lafayette Liquid/Pellet Trough for Modular Chamber with Head Entry
•• Plexon CineLyzer Behavior Analysis System with a color, USB camera
•• Plexon PlexBright 4 Channel Optogenetic Controller with Radiant 2.0
•• Plexon PlexBright Dual LED Commutator
•• Plexon PlexBright Compact LED Modules
•• Plexon PlexBright Optical Patch Cables with LC ferrule stimulation tips
•• Complete with a conference-friendly HexBug to demonstrate the systems in action!

You will have a chance to observe how when an animal crosses specified zones or sequence of zones generating a defined event, CineLyzer sends a TTL signal(s) to either the 4 Channel Optogenetic Controller initiating the specified stimulation pattern or a reward dispenser. This particular list of components within the chamber itself allows for the user to provide liquid or pellet reward to the rat via the reward trough. Small LEDs inside the trough can be illuminated to alert the animals of the reward.

The system as displayed may be expanded to incorporate neural recording and other modular components such as a lever, stimulus lights, nose pokes, tone generators and more can be added for more complex behavioral testing.

Stop by and ask us how we can organize an integrated system for your research!

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www.plexon.com

DID YOU KNOW . . . WHAT A "SIDE-BY-SIDE CONFIGURATION" ERROR MEANS?

Plexon software (Offline Sorter™, OmniPlex, MATLAB® SDKs, etc.) is dependent on Microsoft's Visual C++ redistributable packages to function. We include some of the necessary packages in our software installers, but there are some cases where a freshly installed Windows® PC won't have all of the required redistributable packages installed, and the packages included in Plexon installers won't be enough for the software to run.

If you encounter an error message that contains the phrase "side-by-side configuration", this means that one or more required Microsoft Visual C++ redistributable packages aren't installed on the PC.

If you see this message, please contact Plexon support (support@plexon.com) and let us know about the error, which software is presenting the error, and the computer operating system in use. We can then send the correct redistributable installer to you.

PLEXON WORKSHOP ALUMNI SPEAK OUT: YUICHI MAKINO

"I just joined a lab that uses a couple of Plexon recording setups. I had absolutely no experience in using the Plexon system before joining the lab, so I had to struggle for figuring out how the entire system works. I could get a tremendous help from the Plexon workshop because there I could learn every detail of the Plexon system - what each part of the hardware means, how they are assembled to work together, how to use each function of the software and for what kind of purpose, etc. - on a very, very hands-on style.

Now I am back to the lab and am much more comfortable about using our system. I would definitely recommend this workshop to anyone who uses the Plexon system, but particularly to the people who are new to it."

Yuichi Makino, PhD
Department of Molecular & Cellular Biology, Harvard University

WORKSHOP EARLY REGISTRATION DEADLINE

You bet your reputation and career on your research, and commit serious money to equipping your labs. Why not solidify that investment to ensure you are getting to most out of your equipment – time and quality? Just three days now – for decades of benefit.

Don't miss the early registration deadline: March 31, 2015. Registration price goes up afterwards.

½ PRICED WORKSHOP REGISTRATIONS

When you purchase a PlexBright® System with a 4 Channel Optogenetic Controller, any OmniPlex System or any CineLAB™ System, you are eligible for unlimited half-priced Workshop registrations for the upcoming Plexon Workshop. Ask your sales engineer or email workshop@plexon.com with any questions.

NEW HEADSTAGE DOCUMENTATION

The technical writing team has been hard at work revising and updating the following headstage-related documents:

- • *Headstage Technical Guide*
- • *Headstage Data Sheet*
- • *Headstage Tester Unit Guide*
- • *Connector Data Sheet*
- • *Headstage Cable Data Sheet*

The updates were made primarily in response to the HST/8o25 GEN 2 headstage launch. However, the *Headstage Technical Guide* has also been revised to now include a) the DigiAmp™ and MiniDigi™ Digitizing Amplifier connector pin-out, ground and reference information, and b) the output pin-outs for the digital headstages. All documents can be found under the website Support tab, then Documentation, as well on the respective product pages.

SAVE THE DATE – CHINA WORKSHOP

The China Regional Neurophysiology Workshop sponsored by Hong Kong Plexon has confirmed its dates as July 20-24, 2015. Contact jerry@plexon.com.hk for more information.

PLEXON IS HIRING AGAIN!

We are growing again and are seeking outstanding, neuroscience-loving candidates for the following roles:

- • Technical Sales - Electrophysiology
- • Technical Sales - Behavioral Neuroscience
- • Inside Technical Sales for Neuroscience
- • Technical Support - Neuroscience
- • Senior Windows Software Engineer for Neuroscience

We especially encourage students and lab technicians from neuroscience and behavior research labs to apply. If you are interested, send your resume to jobs@plexon.com.

UPCOMING EVENTS

•• **Computational and Systems Neuroscience (Cosyne) 2015**,
   March 5-8; Salt Lake City, Utah, USA

•• **11th Göttingen Meeting of the German Neuroscience Society**,
   March 18-21; Göttingen, Germany

•• **Experimental Biology 2015**,
   March 28-April 1; Boston, Massachusetts, USA

RESEARCH SPOTLIGHT

Let us know about your 2015 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:

•• Aguilar-Rivera, M. I., J. P. Casanova, R. I. Gatica, G. J. Quirk, and J. A. Fuentealba. "Amphetamine sensitization is accompanied by an increase in prelimbic cortex activity." *Neuroscience* 288 (2015): 1-9.

•• Cerina, Manuela, Hanna J. Szkudlarek, Philippe Coulon, Patrick Meuth, Tatyana Kanyshkova, Xuan Vinh Nguyen, Kerstin Göbel et al. "Thalamic Kv7 channels: pharmacological properties and activity control during noxious signal processing." *British Journal of Pharmacology* (2015).

•• Chang, Chih-Wei, Lei-Chun Chou, Po-Tsang Huang, Shang-Lin Wu, Shih-Wei Lee, Ching-Te Chuang, Kuan-Neng Chen et al. "A double-sided, single-chip integration scheme using through-silicon-via for neural sensing applications." *Biomedical Microdevices* 17, no. 1 (2015): 1-15.

•• França, A. S. C., B. Lobão-Soares, L. Muratori, G. Nascimento, J. Winne, C. M. Pereira, S. M. B. Jeronimo, and S. Ribeiro. "D2 dopamine receptor regulation of learning, sleep and plasticity." *European Neuropsychopharmacology* (2015).

•• Headley, Drew B., Michael V. DeLucca, Darrell Haufler, and Denis Pare. "Incorporating 3D-Printing technology inthe design of Head-caps and electrode drives for recording neurons in multiple brain regions." *Journal of Neurophysiology* (2015): jn-00955.

•• Iordanova, Bistra, Alberto L. Vazquez, Alexander J. Poplawsky, Mitsuhiro Fukuda, and Seong-Gi Kim. "Neural and hemodynamic responses to optogenetic and sensory stimulation in the rat somatosensory cortex." *Journal of Cerebral Blood Flow & Metabolism* (2015).

•• Johnson, Luke A., Weidong Xu, Kenneth B. Baker, Jianyu Zhang, and Jerrold L. Vitek. "Modulation of motor cortex neuronal activity and motor behavior during subthalamic nucleus stimulation in the normal primate." *Journal of Neurophysiology* (2015): jn-00997.

•• Kang, Xiaoxu, S. Santaniello, and M. Schieber. "Task-Independent Cognitive State Transition Detection From Cortical Neurons During 3D Reach-to-Grasp Movements." (2015). *IEEE Transactions on Neural Systems and Rehabilitation Engineering.*

•• Li, P., D. Rial, P. M. Canas, J. H. Yoo, W. Li, X. Zhou, Y. Wang et al. "Optogenetic activation of intracellular adenosine A2A receptor signaling in the hippocampus is sufficient to trigger CREB phosphorylation and impair memory." *Molecular Psychiatry* (2015).

•• McCairn, Kevin W., and Robert S. Turner. "Pallidal Stimulation Suppresses Pathological Dysrhythmia in the Parkinsonian Motor Cortex." *Journal of Neurophysiology* (2015): jn-00701.

•• Murty, N. Apurva Ratan, and Sripati P. Arun. "Dynamics of 3d view invariance in monkey inferotemporal cortex." *Journal of Neurophysiology* (2015): jn-00810.

•• Musto, Alberto E., Chelsey P. Walker, Nicos A. Petasis, and Nicolas G. Bazan. "Hippocampal Neuro-Networks and Dendritic Spine Perturbations in Epileptogenesis Are Attenuated by Neuroprotectin D1." *PLOS ONE* 10, no. 1 (2015).

•• Ngan, N., J. Matsumoto, Y. Takamura, A. Tran, T. Ono, and H. Nishijo. "Neuronal correlates of attention and its disengagement in the superior colliculus of rat." *Frontiers in Integrative Neuroscience:* 9, no. 9 (2015).

•• Ribeiro, M. W.*, Santana, M.B.* e Araújo, M.F.P. "Neuronal Signal Description after Chronic Stainless Steel Microelectrode Array Implants in Marmosets." *XXIV Brazilian Congress of Biomedical Engineering - CBEB 2014* –CBEB 2014. pp. 2620-2623.

•• Riahi, Esmail, Reza Arezoomandan, Zahra Fatahi, and Abbas Haghparast. "The electrical activity of hippocampal pyramidal neuron is subjected to descending control by the brain orexin/hypocretin system." *Neurobiology of Learning and Memory* (2015).

•• Rueda-Orozco, Pavel E., and David Robbe. "The striatum multiplexes contextual and kinematic information to constrain motor habits execution." *Nature Neuroscience* (2015).

•• Shin, D, Y Nakanishi, C Chen, H Kambara, N Yoshimura and Y Koike. "Decoding of Kinetic and Kinematic Information from Electrocorticograms in Sensorimotor Cortex: A Review." *International Journal of Neurorehabilitation Eng* 2014, 1:1.

•• Song, Weiguo, Dennis Q. Truong, Marom Bikson, and John H. Martin. "Trans-spinal direct current stimulation immediately modifies motor cortex sensorimotor maps." *Journal of Neurophysiology* (2015).

•• Sunkara, Adhira, Gregory C. DeAngelis, and Dora E. Angelaki. "Role of visual and non-visual cues in constructing a rotation-invariant representation of heading in parietal cortex." *eLife* 4 (2015): e04693.

•• Walmsley, Lauren, and Timothy M. Brown. "Eye-specific visual processing in the mouse suprachiasmatic nuclei." *The Journal of Physiology* (2015).

•• Xu, Xiaoxiang, Bing Cao, Jun Wang, Tianran Yu, and Ying Li. "Decision-making deficits associated with disrupted synchronization between basolateral amygdala and anterior cingulate cortex in rats after tooth loss." *Progress in Neuro-Psychopharmacology and Biological Psychiatry* (2015).

Recent articles published in full print:

•• Abe, Hiroshi, Justin NJ McManus, Nirmala Ramalingam, Wu Li, Sally A. Marik, Stephan Meyer zum Alten Borgloh, and Charles D. Gilbert. "Adult Cortical Plasticity Studied with Chronically Implanted Electrode Arrays." *The Journal of Neuroscience* 35, no. 6 (2015): 2778-2790.

•• Amemori, Ken-ichi, Satoko Amemori, and Ann M. Graybiel. "Motivation and Affective Judgments Differentially Recruit Neurons in the Primate Dorsolateral Prefrontal and Anterior Cingulate Cortex." *The Journal of Neuroscience* 35, no. 5 (2015): 1939-1953.

•• Ardid, Salva, Martin Vinck, Daniel Kaping, Susanna Marquez, Stefan Everling, and Thilo Womelsdorf. "Mapping of Functionally Characterized Cell Classes onto Canonical Circuit Operations in Primate Prefrontal Cortex." *The Journal of Neuroscience* 35, no. 7 (2015): 2975-2991.

•• Astrand, Elaine, Guilhem Ibos, Jean-René Duhamel, and Suliann Ben Hamed. "Differential Dynamics of Spatial Attention, Position, and Color Coding within the Parietofrontal Network." *The Journal of Neuroscience* 35, no. 7 (2015): 3174-3189.

•• Barter, Joseph W., Suellen Li, Tatyana Sukharnikova, Mark A. Rossi, Ryan A. Bartholomew, and Henry H. Yin. "Basal Ganglia Outputs Map Instantaneous Position Coordinates during Behavior." *The Journal of Neuroscience* 35, no. 6 (2015): 2703-2716.

•• Nieh, Edward H., Gillian A. Matthews, Stephen A. Allsop, Kara N. Presbrey, Christopher A. Leppla, Romy Wichmann, Rachael Neve, Craig P. Wildes, and Kay M. Tye. "Decoding Neural Circuits that Control Compulsive Sucrose Seeking." *Cell* 160, no. 3 (2015): 528-541.

•• Schaffelhofer, Stefan, Andres Agudelo-Toro, and Hansjörg Scherberger. "Decoding a Wide Range of Hand Configurations from Macaque Motor, Premotor, and Parietal Cortices." *The Journal of Neuroscience* 35, no. 3 (2015): 1068-1081.

•• Tingley, David, Andrew S. Alexander, Laleh K. Quinn, Andrea A. Chiba, and Douglas A. Nitz. "Cell Assemblies of the Basal Forebrain." *The Journal of Neuroscience* 35, no. 7 (2015): 2992-3000.

•• Yokoi, Hiroshi, Yuki Sato, Minako Suzuki, Yoshiko Yabuki, Tatsuhiro Nakamura, Takashi Mori, Soichiro Morishita et al. "Engineering Approach for Functional Recovery Based on Body Image Adjustment by Using Biofeedback of Electrical Stimulation." *In Clinical Systems Neuroscience*, pp. 203-247. Springer Japan, 2015.

•• Young, A. M. J., C. Stubbendorff, M. Valencia, and T. V. Gerdjikov. "Disruption of medial prefrontal synchrony in the subchronic phencyclidine model of schizophrenia in rats." *Neuroscience* 287 (2015): 157-163.