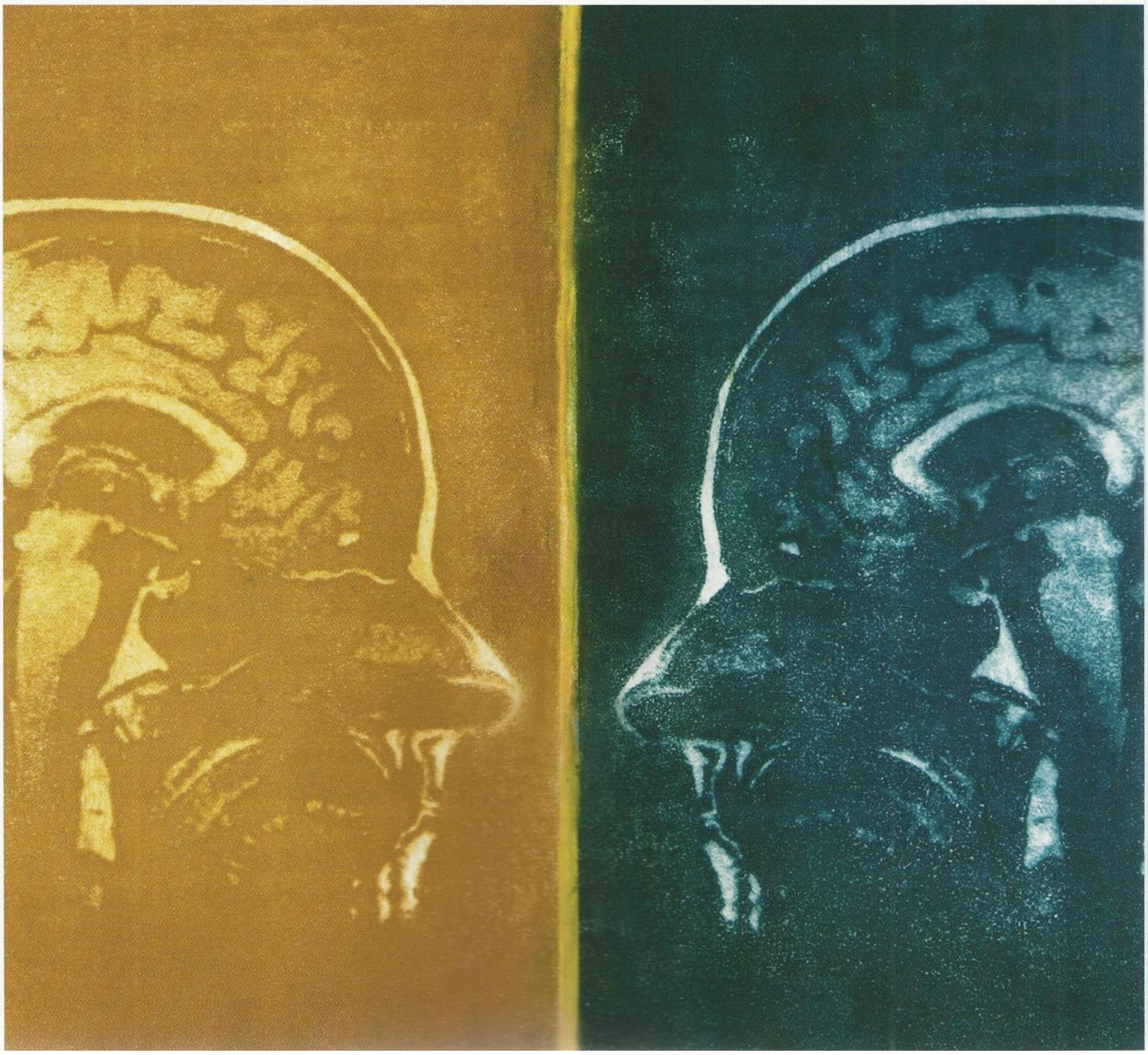
Neuroscience 2015

Chicago | October 17–21

Monday

Scientific Session Listings 269–451

SfN SOCIETY *for* NEUROSCIENCE



10:00 A84 **292.15** The beta2 subunit C loop of the nicotinic acetylcholine receptor directs allosteric modulator specificity. M. M. LEVANDOSKI*; A. R. MACK; C. A. SIBBALD. *Grinnell Col.*

11:00 A85 **292.16** ● Cognitive enhancement through augmentation of alpha7 nicotinic acetylcholine receptor function: *In vitro* and *in vivo* characterization of alpha7 agonist EVP-6124 and alpha7 positive allosteric modulator JNJ-39393406. M. GRUPE*; K. FREDERIKSEN; M. JESSEN; J. FULLERTON STØIER; A. PARACHIKOVA; C. BUNDGAARD; A. MITTOUX; J. BASTLUND. Synaptic Transmission In Vivo, H. Lundbeck A/S, H. Lundbeck A/S, H. Lundbeck A/S, H. Lundbeck A/S, H. Lundbeck A/S, H. Lundbeck A/S.

8:00 A86 **292.17** ● Antidyskinetic effect of the novel α7 nicotinic receptor agonist ABT-126 in parkinsonian monkeys. M. MCGREGOR; D. ZHANG*; T. BORDIA; X. A. PEREZ; M. W. DECKER; M. QUIK. *SRI Intl., AbbVie Inc.*

9:00 A87 **292.18** Striatal cholinergic interneurons regulate L-dopa-induced dyskinesias. T. BORDIA*; X. A. PEREZ; D. ZHANG; M. QUIK. *SRI Intl.*

10:00 A88 **292.19** Nicotinic receptors control prefrontal cortex activity. F. KOUKOULI; M. ROOY; B. GUTKIN; K. SAILOR; J. STITZEL; D. DIGREGORIO; U. MASKOS*. *Inst. Pasteur, ENS, Univ. Colorado, Inst. Pasteur.*

11:00 A89 **292.20** Circuit level mechanisms enable the control of prefrontal cortex activity by nicotinic receptors. M. ROOY; F. KOUKOULI; D. DIGREGORIO; U. MASKOS; B. S. GUTKIN*. *Ecole Normale Superieure, Inst. Pasteur, Inst. Pasteur, Group For Neural Theory, LNC INSERM U960, Ecole Normale Superieure, Natl. Res. Univ. Higher Sch. of Econ.*

POSTER

293. Oscillations and Synchrony: Other I

Theme B: Neural Excitability, Synapses, and Glia: Cellular Mechanisms

Mon. 8:00 AM – *McCormick Place*, Hall A

8:00 A90 **293.01** Building a large-scale cortical network model incorporating laminar structure: Frequency-specific feedforward and feedback interactions. J. F. MEJIAS*; J. D. MURRAY; H. KENNEDY; X. WANG. *Ctr. for Neural Science, New York Univ., Stem-Cell and Brain Res. Institute, INSERM and Univ. de Lyon, NYU-ECNU Inst. of Brain and Cognitive Science, NYU Shanghai.*

9:00 A91 **293.02** Diversity of sharp wave-ripples in the CA1 of the macaque hippocampus and their brain wide signatures. J. F. RAMIREZ-VILLEGAS*; N. K. LOGOTHETIS; M. BESSERVE. *Max Planck Inst. For Biol. Cybernetics, Eberhard-Karls Univ. Tuebingen, The Univ. of Manchester, Max Planck Inst. For Intelligent Systems.*

10:00 A92 **293.03** VIP and SOM interneurons compete to cooperate. M. M. KARNANI*; J. C. JACKSON; I. AYZENSHTAT; R. YUSTE. *Columbia University, Dept. of Biol. Sci.*

11:00 A93 **293.04** Neuronal connectivity at resting-state decreased in cortex induced by cocaine. G. XIAOCHUN*; J. CHOI; N. VOLKOW; Y. PAN; C. DU. *Dept. of Biomed. Engineering, State Univer, Key Lab. of Developmental Genes and Human Diseases, Dept. of Anat. and Neuroscience, Med. School, Southeast University, Nanjing, 210009, PR China, Natl. Inst. on Drug Abuse, NIH.*

8:00 A94 **293.05** Spatio-temporal dynamics of network activity coupled to the action of the neuromodulator adenosine. M. J. RICHARDSON*; F. FERMANI; A. NEWTON; M. THOMAS; M. WALL. *Univ. of Warwick.*

9:00 A95 **293.06** Relating spatial patterns of beta oscillations to their power in macaque motor cortex: A case study in using the "Elephant" data analysis framework in a reproducible analysis workflow. M. DENKER*; L. ZEHL; B. KILAVIK; M. DIESMANN; T. BROCHIER; A. RIEHLE; S. GRÜN. *Jülich Res. Ctr. and JARA, CNRS, Aix-Marseille Univ., RIKEN Brain Sci. Inst., RWTH Aachen Univ.*

10:00 A96 **293.07** Contribution of synchronized GABAergic neurons to dopaminergic neuron firing and bursting. E. MOROZOVA*; D. ZAKHAROV; M. MYROSHNYCHENKO; M. DI VOLO; B. GUTKIN; C. LAPISH; A. KUZNETSOV. *Indiana Univ., Indiana University-Purdue Univ., Inst. of Applied Physics, Indiana Univ., École normale supérieure, Natl. Res. Univ. Higher Sch. of Econ., Indiana University-Purdue Univ.*

11:00 A97 **293.08** Simulating the effects of ethanol on Ventral Tegmental Area local circuit dynamics and Dopamine neuron firing. M. DI VOLO*; E. MOROZOVA; M. MYROSHNYCHENKO; C. LAPISH; A. KUZNETSOV; B. GUTKIN. *Dept. of Physics, IUPUI, Group of Neural Theory, ENS, Program in Neuroscience, Indiana Univ., Addiction Neurosci. Program, IUPUI, Dept. of Mathematical sciences, IUPUI., Theoretical Neurosci. Group, Ctr. for Cognition and Decision Making, Natl. Res. Univ. Higher Sch. of Econ.*

8:00 A98 **293.09** Spontaneous calcium transients precede hemodynamic activity and produce homotopic functional connectivity maps. P. WRIGHT*; A. BAUER; G. BAXTER; J. CULVER. *Washington Univ. In St. Louis.*

9:00 A99 **293.10** Modulation of hippocampal gamma oscillation activity by histone acetylation and nuclear receptor family 4a in Alzheimer's disease model mice. K. TAKASU; K. NIIDOME; M. HASEGAWA; G. SAKAGUCHI; K. OGAWA*. *SHIONOGI & CO., LTD.*

10:00 A100 **293.11** Entrainment of local oscillatory activity in the human brain: Evidence from Intracranial multi-electrode stimulation recordings. J. AMENGUAL; M. VERNET; C. ADAM; A. VALERO CABRE*. *Cerebral Dynamics, Plasticity and Rehabil. Group, Frontlab, Pitié-Salpêtrière Hospital-APHP, Lab. Cerebral Dynamics, Boston Univ. Sch. of Med., Open Univ. of Catalonia (UOC).*

11:00 A101 **293.12** The effect of resonance frequency on network oscillations through electrical gap junction coupling. X. LI*; Y. CHEN; H. G. ROTSTEIN; F. NADIM. *Dept Biol. Sci., Rutgers/Njit, New Jersey Inst. of Technol.*

8:00 A102 **293.13** Modeling the effects of inhibitory and excitatory synchrony on seizure generation in a CA1 circuit. J. R. CRESSMAN*; D. B. DORMAN. *George Mason Univ., George Mason Univ.*

Mon. AM

- ● Indicated a real or perceived conflict of interest, see page 160 for details.
- ▲ Indicates a high school or undergraduate student presenter.
- * Indicates abstract's submitting author

9:00 A103 **293.14** Intracerebral recordings of slow wave and rapid eye-movement sleep in naturally sleeping pigeons. J. VAN DER MEIJ*; G. J. L. BECKERS; N. C. RATTENBORG. *Max Planck Inst. For Ornithology, Cognitive Neurobio. and Helmholtz Institute, Utrecht Univ.*

10:00 A104 **293.15** ▲ Hippocampal rhythm and subfield oscillatory coupling modulation by the hypothalamic vasopressinergic magnocellular system. M. M. MÁRQUEZ*; H. BARRIO-ZHANG; V. S. HERNANDEZ; L. ZHANG. *Nacional Autonomous Univ. of Mexico.*

11:00 A105 **293.16** Neural basis of at-rest band-limited fcMRI. J. LI*; W. J. BENTLEY; L. H. SNYDER. *Washington Univ. In St Louis, Washington Univ. in St Louis.*

8:00 A106 **293.17** Influence of the stomach electrical pacemaker on spontaneous brain activity measured with fMRI. I. REBOLLO*; C. LEBOULLENGER; A. LODEHO; C. TALLON-BAUDRY. *LNC, INSERM, ENS.*

9:00 A107 **293.18** Mapping tACS-entrained brain oscillations using magnetoencephalography (MEG). S. R. SOEKADAR*; M. WITKOWSKI; E. GARCIA COSSIO; B. S. CHANDER; C. BRAUN; L. G. COHEN; S. E. ROBINSON. *Applied Neurotechnology / Univ. of Tübingen, Donders Ctr. for Cognition, Radboud Univ., Univ. of Tübingen, NIH, NIH.*

10:00 A108 **293.19** Frequency dependent entrainment of spontaneous Ca transients by extracellular AC electric fields in CA1 pyramidal neurons of rat hippocampal slices. I. KATO*; H. MIYAKAWA; M. INOUE; T. AONISHI. *Tokyo Inst. of Technol., Tokyo university of Pharm. and Life Sci.*

11:00 B1 **293.20** Effect of inter-modular connection on fast sparse synchronization in clustered small-world networks. S. KIM*; W. LIM. *Inst. of Computat. Neurosci.*

8:00 B2 **293.21** *In vivo* characterization of hippocampal theta and gamma spontaneous oscillations in familial Alzheimer's disease mouse models based on mutant presenilin-2. R. FONTANA*; M. RUBEGA; G. SPARACINO; C. FASOLATO; S. VASSANELLI. *Univ. of Padua, Univ. of Padua, Univ. of Padua.*

9:00 B3 **293.22** Spike-field coupling does not imply spike-spike coupling. E. PETERSON*; B. VOYTEK. *U.C. San Diego.*

POSTER

294. Dendritic Excitability and Synaptic Integration

Theme B: Neural Excitability, Synapses, and Glia: Cellular Mechanisms

Mon. 8:00 AM – *McCormick Place*, Hall A

8:00 B4 **294.01** Investigating spiking resonance in computational models of oriens-lacunosum/moleculare (O-LM) hippocampal interneurons with dendritic synaptic inputs. V. SEKULIC*; J. J. LAWRENCE; F. K. SKINNER. *Univ. Hlth. Network, Univ. of Toronto, Texas Tech. Univ. Hlth. Sci. Ctr., Univ. of Toronto.*

9:00 B5 **294.02** Predicting cell-type specific active properties by developing multi-compartment models using databases and electrophysiological feature constraints: Application to interneuron specific 3 (IS3) cells in the hippocampus. A. T. GUET-MCCREIGHT*; O. CAMIRÉ; L. TOPOLNIK; F. K. SKINNER. *Toronto Western Res. Inst., Univ. of Toronto, Ctr. de Recherche de l'Institut Universitaire en Santé Mentale de Québec, Univ. Laval, Univ. of Toronto.*

10:00 B6 **294.03** Dendritic integration in dentate gyrus parvalbumin expressing perisoma inhibiting interneurons. C. ELGUETA*; M. BARTOS. *Freiburg Univ.*

11:00 B7 **294.04** Characterization of dendritic processing for signal propagation in model primary neurons. H. KIM*. *Daegu Gyeongbuk Inst. of Sci. & Technol.*

8:00 B8 **294.05** Graded boosting of synaptic signals by low threshold voltage activated calcium conductance. M. CARBÓ-TANO; L. SZCZUPAK*. *IFIByNE UBA-CONICET, Univ. de Buenos Aires.*

9:00 B9 **294.06** Continuous gradients of gene expression underlie prominent CA1 pyramidal neuron variability. M. S. CEMBROWSKI*; J. L. BACHMAN; L. WANG; K. SUGINO; B. SHIELDS; N. SPRUSTON. *Howard Hughes Med. Inst.*

10:00 B10 **294.07** Localized synaptically activated sodium signals in hippocampal pyramidal neurons show both AMPA and NMDA receptor components. K. MIYAZAKI*; W. N. ROSS. *New York Med. Col.*

11:00 B11 **294.08** Two-photon subcellular optogenetic stimulation of layer 2/3 cortical pyramidal neurons *in vivo* during network activity. L. FERRARESE*; J. F. A. POULET. *Max Delbrueck Ctr. Berlin-Buch, Neurosci. Res. Ctr. and Cluster of Excellence NeuroCure, Charité-Universitätsmedizin.*

8:00 B12 **294.09** *In vivo* adrenergic modulation of dendritic HCN channels in layer 5 pyramidal neurons. M. LONDON*; C. LABARRERA MØNSTED. *The Hebrew Univ. of Jerusalem.*

9:00 B13 **294.10** Functional role of coupling axons to dendrites in layer 5 pyramidal neurons. M. S. HAMADA*; M. H. KOLE. *Netherlands Inst. for Neurosci.*

10:00 B14 **294.11** Active dendritic integration in L5 pyramidal neurons forms a conjunctive sensorimotor representation that contributes to learning. G. NATTAR RANGANATHAN*; N. XU; J. C. MAGEE. *Howard Hughes Med. Inst., Shanghai Inst. for Biol. Sciences, Chinese Acad. of Sci.*

11:00 B15 **294.12** Integration of synaptic input during active firing in the L5 pyramidal neurons of mouse motor cortex. N. C. DEMBROW*; G. S. NEWKIRK; W. SPAIN. *Univ. of Washington, VA Epilepsy Ctr. for Excellence.*

8:00 B16 **294.13** Dendritic nonlinearities are tuned to fast synaptic inward currents. B. KALMBACH; R. A. GRAY*; D. JOHNSTON; E. COOK. *The Univ. of Texas At Austin, McGill Univ.*

9:00 B17 **294.14** The interplay between synaptic and nonsynaptic activity. Y. BUSKILA; J. C. TAPSON*; J. MORLEY; A. VAN SCHAIK. *Univ. of Western Sydney, Univ. of Western Sydney, Univ. of Western Sydney.*

• Indicated a real or perceived conflict of interest, see page 160 for details.
▲ Indicates a high school or undergraduate student presenter.
* Indicates abstract's submitting author

Effect of Inter-Modular Connection on Fast Sparse Synchronization in Clustered Small-World Neural Networks

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We consider a clustered network with small-world sub-networks of inhibitory fast spiking Izhikevich interneurons, and investigate the effect of inter-modular connection on emergence of fast sparsely synchronized rhythms by varying both the inter-modular coupling strength J_inter and the average number of inter-modular links per interneuron M_syn^(inter). In contrast to the case of non-modular networks, modular and global synchronized states are found. For the case of modular sparse synchronization the population behavior reveals the clustering structure, because the intra-modular dynamics of sub-networks make some mismatching. On the other hand, in the case of global sparse synchronization, the population behavior is globally identical, independently of the cluster structure, because intra-modular dynamics of sub-networks make perfect matching. We use a realistic cross-correlation modularity measure, representing the matching-degree between the instantaneous sub-population spike rates of the sub-networks, and examine whether the sparse synchronization is global or modular. Depending on its magnitude, the inter-modular coupling strength J_inter seems to play ``dual" roles for the pacing between spikes in each sub-network. For large J_inter, due to strong inhibition it plays a destructive role to ``spoil" the pacing between sparse spikes, while for small J_inter it plays a constructive role to ``favor" the pacing between spikes. Through competition between the constructive and the destructive roles of J_inter, there exists an intermediate optimal J_inter at which the pacing degree between spikes becomes maximal. In contrast, the average number of inter-modular links per interneuron M_syn^(inter) seems to play a role just to ``favor" global communication between sub-networks. With increasing M_syn^(inter), the degree of effectiveness of global communication increases monotonically. Furthermore, we employ the realistic whole- and sub-population order parameters, based on the instantaneous whole- and sub-population spike rates, to determine the threshold values for the synchronization-unsynchronization transition in the whole- and sub-populations, and the degrees of global and modular sparse synchronization are also measured in terms of the realistic statistical-mechanical whole- and sub-population spiking measures defined by considering both the occupation and the pacing degrees of spikes. It is expected that our results have important implications for the role of the brain's ability to change its structure and function by modifying the strength or efficacy of synaptic transmission.