

# The NKI Informer



Nathan S. Kline  
Institute

*A newsletter of the Nathan S. Kline Institute for Psychiatric Research*

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November – December, 2018

*Stuart Moss, MLS, Editor*

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## **C-BIN ADDS COMPUTATIONAL POWER TO ITS LINEUP**



**Samuel (Sam) Neymotin, PhD**, joined NKI's Center for Biomedical Imaging and Neuromodulation (C-BIN) in August as a Research Scientist. Sam's research focus is in computational neuroscience,

using computer simulations of the nervous system in order to test hypotheses about the in vivo origins of neural dynamics and functions, to make predictions on the origins of neuropsychiatric disorders, and using models to help develop novel electrical stimulation and pharmacological treatments for neuropsychiatric disorders.

At NKI, Sam will continue his long-standing collaboration with Peter Lakatos on developing biologically-realistic, data-driven, computational models of the thalamocortical system in order to understand how the rhythms of the thalamocortical circuitry support auditory stimulus processing, and how the circuitry produces flexible oscillations entrained to auditory stimuli. The ultimate goal is to combine experiments and modeling to determine the mechanisms and functions of neuronal oscillations in auditory information processing and segregation/parsing of naturalistic auditory streams/elements. This research may ultimately shed light on the circuit-level origins of hearing and neuropsychiatric disorders.

In past research Sam developed models of neurons and neuronal networks including laminar models of neocortex, thalamus, and hippocampus, constrained with anatomical and electrophysiological data from experimental labs. Using the models, he bridged gaps from microcircuit structure to dynamics and function.

His research focused on understanding how oscillations and dynamical patterns observed in experimental data emerge from interactions of multiple classes of excitatory and inhibitory neurons within thalamocortical circuits. Sam's work demonstrated that local ensemble processing associated with gamma oscillations reduces the flow of external information into the circuit. He also simulated application of the psychotomimetic ketamine and replicated *in vivo* changes of theta/gamma oscillations. The increased gamma correlated with reduced information flow from the outside. This may explain some of the dissociation from reality associated with hallucinations.

In order to increase translational relevance of the models and to better understand the origins of noninvasively recorded human MEG/EEG signals, Sam recently led development of the Human Neocortical Neurosolver (HNN) software package, which provides a user-friendly graphical user interface on top of a biophysically realistic model of the thalamocortical system. The model simulates current dipole signals directly comparable to source-localized MEG/EEG and ECoG (electrocorticography) signals, enabling clinicians and experimentalists to test hypotheses on cell and circuit level origins of their data. Sam plans to use invasive multisite laminar electrode array recordings from the nonhuman primate thalamocortical system collected by Peter Lakatos' lab to test the models. The models will help resolve the origins of neurological and psychiatric diseases, which manifest as alterations in dynamic patterns observed in the data.

Sam received BS/MS degrees in computer science and a PhD in biomedical engineering with a focus on computational neuroscience and electrophysiological data analysis. After his PhD, Sam completed his postdoc at Yale modeling electrical/chemical interactions in pyramidal neurons and how these interactions contribute to working memory. Prior to joining NKI in 2018, Sam was Assistant Professor (Research) first at SUNY Downstate and then at Brown University.

## GRANTS RECEIVED



**Dr. Robert Sears** (Emotional Brain Institute) received a [NARSAD Young Investigator](#) award from the Brain & Behavior Research Foundation for a grant titled "The Orexin System as a Master Modulator of Proactive Coping Behavior."



**Dr. Christopher Cain** (Emotional Brain Institute) received an R01 from the National Institute on Drug Abuse for the grant titled "[Brain Mechanisms of Avoidance: Implications for Addiction and Anxiety](#)." This is a collaboration with Dr. Joseph LeDoux at New York University.



**Dr. Ralph Nixon** (Center for Dementia Research) received a grant from the [CHDI Foundation](#) titled "In Vivo Evaluation and Therapeutic Modulation of Neuronal Autophagy Flux in HD Mouse Models: Validation of a Transgenic Reporter for In Vivo Neuronal Macroautophagy."

## KUDOS



Once again, two NKI investigators appear on the 2018 [Clarivate Analytics list of Highly Cited Researchers](#). **F. Xavier Castellanos, MD** (Clinical Research), and **Michael Milham, MD, PhD** (Biomedical Imaging & Neuromodulation), are both recognized for their contributions in the field of Neuroscience & Behavior. Designation as a Highly Cited Researcher indicates authorship of multiple papers ranking in the top 1% by citations for field and year in Web of Science.

## FROM AROUND THE INSTITUTE

### Clinical Research Community Event

The **Clinical Research Department** presented “Brain Health: Depression and OCD” at NKI on Monday, November 5. This event was open to the public and included presentations by leading experts and NKI researchers **Dan Iosifescu, MD** and **Emily Stern, PhD**. Drs. Iosifescu and Stern spoke about depression and obsessive-compulsive disorder and hosted a question and answer session. 60 community members and clinicians wishing to learn more about depression and OCD attended the event. Many of these individuals expressed interest in attending future events at NKI.

# RAISE

A Research Project of the NIMH  
Early Treatment Program

The **Information Sciences Division (ISD)** was recently recognized in *Schizophrenia Research* for its work as the Data Management Center on the Recovery After Initial Schizophrenia Episode – Early Treatment Program (RAISE-ETP) study. The article describes the approach to training and implementing the NAVIGATE program – a comprehensive intervention program for people experiencing their first episode of psychosis – and evaluates the fidelity of service delivery to the NAVIGATE model. The results indicate that the NAVIGATE program can be implemented with good fidelity to the treatment model in a diverse array of community mental health care settings serving persons with a first episode psychosis.

Mueser, K.T., et al., [Implementation and fidelity assessment of the NAVIGATE treatment program for first episode psychosis in a multi-site study](#), *Schizophr. Res.* (2018).



**Dr. Russ Tobe** (Outpatient Research) presented at the Westchester Autism Conference, held on November 17 in Tarrytown. Dr. Tobe’s talk was on “Assessment and Treatment of Psychiatric Disorders Co-occurring with Intellectual Disability and Autism Spectrum Disorders”.

**Alexis Lieval, LCSW** and **Molly Ludlow** (Outpatient Research) were also at the event to discuss research opportunities with community providers, families, and clients attending the symposium.

## COMPLIANCE CORNER



### The 3Rs of Animal Research: Part 1

By Karya Ottey, PhD  
Director of Compliance

This is part I in the 3Rs of Animal Research series of Compliance Corner. The 3Rs of animal research are characterized as Replacement, Reduction, and Refinement. The 3Rs are significant from a legal, ethical, and scientific standpoint as they help to focus the Institutional Animal Care and Use Committee (IACUC) on some of the important considerations in using animals in research. The IACUC is a committee with federally mandated oversight responsibilities to ensure the best care and treatment of research animals. In relation to the 3Rs, the IACUC evaluates whether the correct animals are used for an experiment, whether the smallest feasible number of animals are utilized, and whether the project can be refined to alleviate any pain or suffering to the research animals. In performing this task, the IACUC has a deep reliance on the relationship with the Principal Investigator and other research staff to properly communicate the research process and to adhere to the external and internal regulatory requirements.

One such regulatory requirement relates to duplication of previously conducted research endeavors. The Animal Welfare Act (AWA; § 2.31, d, 1, iii) specifically indicates, “the principal investigator has provided written assurance that the activities do not unnecessarily duplicate previous experiments.” As such, the IACUC is tasked with confirming that the information provided by the investigative team demonstrates a good faith effort to confirm that any newly proposed research project is unique. The confirmation that duplication has not occurred is a separate justification than that which is provided to confirm that alternative animal models or alternatives to the use of animals have been considered in a research project. These activities

place the IACUC in a delicate position of straddling a nebulous intersection of animal welfare, scientific merit, and scientific integrity. The IACUC is obligated to confirm that the model choice is supported by sound, objective, and logical reasoning. In reviewing duplication, investigators should draft protocols to present the IACUC with information that grounds the project in terms of why processes are necessary versus unnecessary, and the rationale that led the investigator to this conclusion.

Unfortunately, there are no clear guidelines or laws to define what unnecessary means. Investigators should look to refinement and reduction when considering models that can aid in reducing the likelihood of duplication. When investigators understand that regulatory compliance aids in improving reproducible efforts, it becomes easier to create a culture that strives to influence great models for animal design that can be emulated and elevated for new research concepts. All researchers should be aware of the importance of reproducibility as it relates to animal welfare concerns and to improving regulatory oversight and research integrity.

## PUBLICATIONS OF NOTE

### Neuron

**Michael Milham** and **Charles Schroeder** (Biomedical Imaging & Neuromodulation) are the corresponding and senior authors of this open access NeuroResource paper published in *Neuron*. The article is featured in an [editorial preview](#).

Milham MP, Ai L, Koo B, Xu T, Amiez C, Balezeau F, Baxter MG, Blezer ELA, Brochier T, Chen A, Croxson PL, Damatac CG, Dehaene S, Everling S, Fair DA, Fleysher L, Freiwald W, Froudust-Walsh S, ... Schroeder CE. [An Open Resource for Non-human Primate Imaging](#). *Neuron*. 2018 Oct 10; 100(1):61-74.e2. PMID: 30269990.

The American Journal of  
**Psychiatry**

**Antigona Martinez** and **Daniel Javitt** (Schizophrenia Research) are the first and last authors of this article appearing in the December issue of *The American Journal of Psychiatry*. The article is featured in an Editor Spotlight video, and it is also covered in Psychiatry Advisor [here](#).

Martínez A, Gaspar PA, Hillyard SA, Andersen SK, Lopez-Calderon J, Corcoran CM, Javitt DC. [Impaired Motion Processing in Schizophrenia and the Attenuated Psychosis Syndrome: Etiological and Clinical Implications](#). Am J Psychiatry. 2018 Oct 3. PMID: 30278791.

Current Opinion in  
**Behavioral Sciences**

Several members of the **Emotional Brain Institute** have recent publications in *Current Opinion in Behavioral Sciences*. **Joseph LeDoux** is co-editor of volume 24 (on Survival Circuits), in which **Elizabeth Phelps** and **Regina Sullivan** and **Maya Opendak** also have articles. In addition, **Christopher Cain** published a paper in volume 26 (on the theme of Pain and Aversive Motivation).

Mobbs D, Ledoux J. [Editorial overview: Survival behaviors and circuits](#). Current Opinion in Behavioral Sciences 2018; 24:168-71.

Cain CK. [Avoidance problems reconsidered](#). Current Opinion in Behavioral Sciences 2019; 26:9-17.

de Voogd LD, Hermans EJ, Phelps EA. [Regulating defensive survival circuits through cognitive demand via large-scale network reorganization](#). Current Opinion in Behavioral Sciences 2018; 24:124-9.

Sullivan RM, Opendak M. [Developmental and neurobehavioral transitions in survival circuits](#). Current Opinion in Behavioral Sciences 2018; 24:50-5.

**BRAIN**  
STIMULATION

Basic, Translational, and Clinical Research in Neurostimulation

**J.P. Lindenmayer** and colleagues at the **Manhattan Psychiatric Center** authored a new paper in *Brain Stimulation*.

Lindenmayer JP, Kulsa MKC, Sultana T, Kaur A, Yang R, Ljuri I, Parker B, Khan A. [Transcranial direct-current stimulation in ultra-treatment-resistant schizophrenia](#). Brain Stimul. 2018 Oct 2. PMID: 30316742.

**Autophagy**

**Ju-Hyun Lee** and other members of the **Nixon Lab** (Dementia Research) have a new article online in *Autophagy*.

Lee JH, Rao MV, Yang DS, Stavrides P, Im E, Pensalfini A, Huo C, Sarkar P, Yoshimori T, Nixon RA. [Transgenic expression of a ratiometric autophagy probe specifically in neurons enables the interrogation of brain autophagy in vivo](#). Autophagy. 2018 Sep 29:1-15. PMID: 30269645.

**Lasers in Surgery  
and Medicine**

**Dan Iosifescu** (Clinical Research) is a coauthor of this paper appearing online in *Lasers in Surgery and Medicine*.

Cassano P, Dording C, Thomas G, Foster S, Yeung A, Uchida M, Hamblin MR, Bui E, Fava M, Mischoulon D, Iosifescu DV. [Effects of transcranial photobiomodulation with near-infrared light on sexual dysfunction](#). Lasers Surg Med. 2018 Sep 17. PMID: 30221776.



Dr. Iosifescu is also a coauthor of this article recently published in *Photomedicine and Laser Surgery*.

Cassano P, Petrie SR, Mischoulon D, Cusin C, Katnani H, Yeung A, De Taboada L, Archibald A, Bui E, Baer L, Chang T, Chen J, Pedrelli P, Fisher L, Farabaugh A, Hamblin MR, Alpert JE, Fava M, Iosifescu DV. [Transcranial Photobiomodulation for the Treatment of Major Depressive Disorder. The ELATED-2 Pilot Trial](#). *Photomed Laser Surg*. 2018 Oct 20. PMID: 30346890.

[PubMed Central](#), the full text repository of journal literature hosted at the National Library of Medicine, is now aggregating information about data associated with an article, when available. Data citations, data availability statements and supplementary materials will be displayed in an Associated Data box. For more details about this new feature, see "[Discovering associated data in PMC](#)".



### INFO UPDATE



The NYU Health Sciences Library has a tool to help their off-site users access full text documents. If you use the NYU Health Sciences Library to access full text literature online, you may find this "bookmarklet" to be a convenient addition to your workflow. It can be used on an iPhone or iPad as well as a web browser. [This Library web page](#) describes the bookmarklet and how to install it. The page also includes bookmarklets for searching PubMed and Google Scholar.



"[MedGen](#) is a free, comprehensive resource for one-stop access to essential information on phenotypic health topics related to medical genetics as collected from established high-quality sources." For more on how to use it, see "[MedGen: Your search engine for human medical genetics](#)".

A group of librarians at the University of Michigan has created a free online course on [Advanced Literature Searching in the Health Sciences](#). This self-paced course is open to everyone. It includes lectures, interviews, demos, hands-on activities, and quizzes. If you have any involvement with the literature search process, you may find the course beneficial. Check it out and become a better searcher!

The NKI librarian is always available to assist with literature searching, citation searching (Web of Science, Scopus), bibliographic reference management, and the like. When you have any information needs, or questions about available resources, don't hesitate to turn to us.

The library offers a comfortable, quiet space for reading, work, and small meetings. To use the library's Wi-Fi network, ask the library staff for the password.

You can [link to the NKI Library's website](#) from myNKI. The Library site includes quick links to the NYU Health Sciences Library and to the New York State Library, as well as links to NKI's own library resources ([journal finder](#), [online catalog](#), [PsychiatryOnline](#), etc.). Remote access is available using NKI's VPN.

## DEPARTMENT OF WONDER

### The Perils of Peer Review

A recent article in *The New York Times* considers the merits, and many flaws, of the peer review system in academic publishing. "[Peer Review: The Worst Way to Judge Research, Except for All the Others](#)" includes many links to related sources, and concludes with some suggestions for improving the system.

## EVENTS AND SEMINARS

### Center for Biomedical Imaging and Neuromodulation Seminar Series

#### Sean Froudist-Walsh, PhD

Center for Neural Science, New York University

***Distributed effects of hippocampal lesions in space and time. Insights from human and non-human primates***

December 17<sup>th</sup>

#### Moriah Thomason, PhD

NYU School of Medicine

***Prenatal influences over human fetal functional brain network development***

January 7<sup>th</sup>

#### Emily Finn, PhD

NIMH

***Title TBA***

January 14<sup>th</sup>

#### William Lytton, MD

SUNY Downstate Medical Center

***Title TBA***

January 28<sup>th</sup>

#### Seok-Jun Hong, PhD

Child Mind Institute

***Title TBA***

February 4<sup>th</sup>

#### Megan K. Horton, PhD

Mount Sinai School of Medicine

***Title TBA***

February 11<sup>th</sup>

#### Ki Sueng Choi, PhD

Mount Sinai School of Medicine

***Title TBA***

February 25<sup>th</sup>



### Center for Dementia Research Seminar Series

*Held on Thursdays at 10 am*

#### Panagiotis Roussos, MD, PhD

Icahn School of Medicine

***Big data analysis and genetic liability to neuropsychiatric disease***

January 17<sup>th</sup>

## NKI PUBLICATIONS UPDATE

**Zhe Chen, PhD**

New York University

***Dissecting neural mechanisms of evoked and spontaneous pain: A multidisciplinary approach***

January 31<sup>st</sup>

**Cristina Alberini, PhD**

New York University

***Molecular mechanisms underlying long-term memory***

February 21<sup>st</sup>

**Shane Liddelow, PhD**

New York University

***What do reactive astrocytes do***

February 28<sup>th</sup>

The New York State Office of Mental Health (OMH) regularly hosts an interactive video broadcast covering the latest research, technology, and treatment implementation in the fields of psychiatry and psychology. These programs are recorded, and the archived Statewide Grand Rounds programs can be viewed [on the OMH website](#).

Below is a list of references that have been added to the NKI publications database since the previous update. The full database contains over 5,900 items dating back to 1995 and can be searched from the [myNKI website](#).

Ahuja S, Chen RK, Kam K, Pettibone WD, Osorio RS, Varga AW. Role of normal sleep and sleep apnea in human memory processing. *Nat Sci Sleep*. 2018 Sep 4; 10:255-269. PMID: 30214331.

Baril AA, Carrier J, Lafrenière A, Warby S, Poirier J, Osorio RS, Ayas N, Dubé MP, Petit D, Gosselin N; Canadian Sleep and Circadian Network. Biomarkers of dementia in obstructive sleep apnea. *Sleep Med Rev*. 2018 Dec; 42:139-148. PMID: 30241998.

Beebe B, Myers MM, Lee SH, Lange A, Ewing J, Rubinchik N, Andrews H, Austin J, Hane A, Margolis AE, Hofer M, Ludwig RJ, Welch MG. Family nurture intervention for preterm infants facilitates positive mother-infant face-to-face engagement at 4 months. *Dev Psychol*. 2018 Nov; 54(11):2016-2031. PMID: 30284883.

Cassano P, Dording C, Thomas G, Foster S, Yeung A, Uchida M, Hamblin MR, Bui E, Fava M, Mischoulon D, Iosifescu DV. Effects of transcranial photobiomodulation with near-infrared light on sexual dysfunction. *Lasers Surg Med*. 2018 Sep 17. PMID: 30221776.

Cassano P, Petrie SR, Mischoulon D, Cusin C, Katnani H, Yeung A, De Taboada L, Archibald A, Bui E, Baer L, Chang T, Chen J, Pedrelli P, Fisher L, Farabaugh A, Hamblin MR, Alpert JE, Fava M, Iosifescu DV. Transcranial Photobiomodulation for the Treatment of Major Depressive Disorder. The ELATED-2 Pilot Trial. *Photomed Laser Surg*. 2018 Oct 20. PMID: 30346890.

Delaney S, Fallon B, Alaedini A, Yolken R, Indart A, Feng T, Wang Y, Javitt D. Inflammatory biomarkers in psychosis and clinical high risk populations. *Schizophr Res*. 2018 Nov 8. PMID: 30414721.



Dong C, Chen J, Harrington A, Vinod KY, Hegde ML, Hegde VL. Cannabinoid exposure during pregnancy and its impact on immune function. *Cell Mol Life Sci*. 2018 Oct 29. PMID: 30374520.

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