Transcranial focused ultrasound (FUS) has recently seen a large increase in its use as a non-invasive method of targeted neuromodulation. Previous research has shown that FUS can cause focal disruptions of neural activity. Importantly, with properly calibrated transducers, one can target regions at a variety of depths. While the use of FUS as a neuromodulatory technique is still in its early stages, there has been a large effort by the groups involved in testing the parameter space and defining the most effective stimulation protocols (King et al 2013). Since these early studies, FUS has been translated to both human and nonhuman primate (NHP) studies. While FUS can act directly on brain tissue to modulate neuronal functioning, it can also be used as part of a novel non-invasive neuronal transfection procedure. Previous research in both rodents and NHPs has shown that FUS can reliably produce transient openings of the blood brain barrier (BBB) (Marquet et al., 2011, 2014; Konofagou et al., 2012; Tung et al., 2011). Through the delivery of focused ultrasound to targeted brain structures, it is possible to temporarily open the BBB in a circumscribed brain region, and then load the peripheral circulatory system with viral constructs designed to deliver genetic material that does not ordinarily cross the BBB. This enables the noninvasive delivery of drugs or neuromodulators (DREADD* and optogenetic receptors) through the peripheral circulation, and makes FUS a potentially ideal translational method for delivering both chemogenetic and optogenetic approaches.

* Designer Receptors Exclusively Activated by Designer Drugs

While still in its early stages as a methodology, FUS shows promise for being able to safely and efficiently allow drugs and viral vectors to cross the BBB at precise locations in humans. Toward this end, Drs. Arnaud Falchier, Brian Russ, and Charles Schroeder of NKI (Translational Neuroscience Laboratories, Center for Biomedical Imaging & Neuromodulation) have begun a novel research project.
project which aims to determine the feasibility and effects of noninvasive DREADD manipulation on Parkinsonian symptoms in nonhuman primates. The NKI team has started this project in collaboration with researchers from Columbia University, in particular Drs. Serge Przedborski, Kimberly Kwei, Guy McKhann, Vincent Ferrera, and Elisa Konofagou.


FROM AROUND THE INSTITUTE

NKI Summer Scholars

Contributed by Internship Program Co-Directors Kristin Dietz Trautman, LCSW and Anna MacKay-Brandt, PhD

It may be snowing outside, but we are getting ready for our summer internship program, newly named NKI Summer Scholars. Considering the uncertain course of the pandemic, we have offered remote and partially remote summer placements.

Since the first of December, we have received almost 200 applications from listings on Handshake and other college recruiting sites. With so many high caliber candidates, it is difficult to select a feasible number to interview. We are happy to forward applications to investigators who have openings for interns and wish to participate in the program.

NKI Summer Scholars have a faculty mentor who guides and directs their individualized internship experience. In addition, the NKI internship program hosts weekly presentations and discussions on a variety of topics. These seminars are led by NKI faculty and tailored to interns’ interests, level of experience, and educational and career goals. In addition to faculty presentations on their areas of expertise, discussions of their own education and career paths have proven to be quite popular. The seminars will be held from 12-1 pm on Wednesdays from the first week in June through the first week in August. If you would like to have your intern participate in this program or if you would like to be a faculty presenter, please let us know. We are happy to add to the diversity of our Summer Scholars cohort and to the range of our faculty seminar offerings.

Faculty interested in publicizing internship opportunities in their own departments or research groups may want to list positions on college recruitment sites. We would be glad to offer guidance on that process.
Anina Klein, of the Information Sciences Division (ISD) and the Compliance Department’s Post-Approval Monitoring Program, is excited to announce that a study for which she is a monitor announced positive results from its Year 2 analysis. The pivotal Phase 3 CARDINAL Study of Bardoxolone Methyl in pediatric and adult patients with Alport Syndrome reported positive outcomes with regard to kidney functioning for patients who either remained on or discontinued study drug. Based on these results, Reata Pharmaceuticals will be submitting a New Drug Application to the FDA in the first quarter of 2021. Bardoxolone Methyl has the potential to become the first approved therapy for Alport Syndrome, a life-threatening disease that affects 30,000-60,000 patients in the United States. More information can be found in this press release.

In addition to the CARDINAL Study, Anina is a monitor for two other Reata studies: EAGLE, an open label extension of the CARDINAL study, and FALCON, a Phase 3 study of Bardoxolone Methyl in adult patients with Polycystic Kidney Disease. For those who may not be familiar with clinical research monitoring, a monitor (or Clinical Research Associate (CRA)) ensures clinical sites are complying with the protocol, adhering to the principles of Good Clinical Practice as well as local, state, and federal guidelines, producing quality and verifiable data, and that the rights, safety, and well-being of research participants are protected.

Dr. Ralph Nixon (Dementia Research) is quoted in a recent article on the Alzforum site. The online entry, “Do Lysosomes Help Propagate Tau Seeds”, comments on a primary publication in Acta Neuropathologica.

After working as a Laboratory Animal Care Technician for a little over a year, Taylor Hendrickson has been promoted to Research Support Assistant in Efrat Levy’s lab (Dementia Research). Taylor is excited for the opportunity to learn laboratory techniques and participate in research.

PUBLICATIONS OF NOTE

Henry Evrard (Biomedical Imaging & Neuromodulation) coauthored this recent paper in Nature.


NKI Director Donald Goff published this JAMA Insights review summarizing medication options for patients with schizophrenia.

Menahem Krakowski (Clinical Research), with Umit Tural and Pal Czobor, published his latest results in the American Journal of Psychiatry. This paper was highlighted in an APA Psychiatric News alert: “Clozapine Found Most Effective to Reduce Aggression in Patients with Schizophrenia and Conduct Disorder”.


Also recently published in the American Journal of Psychiatry is this paper coauthored by Kate Collins (Clinical Research).


Katlyn Nemani (Clinical Research) published this paper with Donald Goff, Eva Petkova, and others in JAMA Psychiatry. The article has received widespread attention, including a Psychiatric News Alert and a HealthDay news report. In addition, Dr. Goff did an audio interview with JAMA Psychiatry, and Dr. Nemani will be the OMH Statewide Grand Rounds presenter on February 17.


Also appearing in JAMA Psychiatry is this Viewpoint by Center for Biomedical Imaging and Neuromodulation Director Michael Milham, Ting Xu, and Joshua Vogelstein.


Emily Stern (Clinical Research) coauthored this Expert Review published in Molecular Psychiatry.


Marilena Lekas, Kerstin Pahl, and Crystal Lewis (Social Solutions & Services) contributed this Perspectives piece to the open access Health Services Insights journal.

The latest research from the lab of Center for Dementia Research Director Ralph Nixon appears in *Cell Reports*. Anna Pensalfini is the first author of this open access paper.


Pejman Sehatpour and other members of the Schizophrenia Research group published this paper in the open access journal *Frontiers in Psychiatry*. Schizophrenia Research Director Daniel Javitt is the senior author.


Also recently published in *Frontiers in Psychiatry* is this paper coauthored by Clinical Research Director Dan Iosifescu.


Megan Gautier and Stephen Ginsberg (Dementia Research) recently published their latest paper in the *Journal of Neuroscience Methods*.


Umit Tural and Dan Iosifescu (Clinical Research) published a systematic review in the *Journal of Psychiatric Research*.


Alex Franco, Michael Milham, Stan Colcombe, and Ryan Lim (Biomedical Imaging & Neuromodulation) coauthored this open access article appearing in *Neuroimage*.

**INFO UPDATE**

Library services continue uninterrupted. As always, if you need documents, assistance with literature searching, or have reference questions, the NKI librarian is at your service.

Login changes for NCBI accounts are coming soon. After June 1, it will be necessary to login using your institution, social media, Google, Microsoft or login.gov account username and password. More details and guidance about this change can be found [here](#). A webinar discussing the changes will be held on March 3. You can [register here](#) for the webinar.

For some insight into how Google searching works, check out a [series of articles](#) that was recently published on the Google Keyword blog. Topics covered include how Google organizes information, where all the information comes from, how search ads work, how location helps provide relevant results, and more.

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**Xavier Castellanos** (Clinical Research) coauthored this review on ADHD imaging in *Current Opinion in Psychiatry*.


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**NIH** U.S. National Library of Medicine

Over the year, the COVID-19 pandemic has galvanized the world’s attention and energy. But this is not the first public health crisis (and it won’t be the last), and it stands to reason that looking to past experience could be instructive. One wide-ranging place to start is this National Library of Medicine (NLM) [online collections tour](#) focused on epidemics. Resources include images and films from the historical collection, online exhibitions, and recorded NLM history talks.

**MedlinePlus**

Has your doctor prescribed a new medication for you and you want to learn more about it? Do you want to know if a dietary supplement will interact with a medication you are taking? MedlinePlus has information on drugs, herbs, and supplements including side effects, dosage, and special precautions. MedlinePlus also provides a wealth of information on numerous health topics, genetics, and medical tests. It even has [healthy recipe suggestions](#).

**New York State Library**

NKI employees are eligible to register with the New York State Library in order to access the Library’s substantial [electronic resources](#). (Note that all New York residents can register, but NYS government employees have access to a lot more.) Instructions to register are [here](http://www.nysl.nysed.gov/apply.htm).

(If you need assistance verifying your agency employment while at home, the NKI librarian can do that for you.)
Without a doubt, the runaway science story of 2020 was the accelerated **development of the COVID-19 vaccines**. But you can also catch up on some **other big stories in science** courtesy of the NIH Director’s Blog. You can also find some great science images **here** (from Nature).

And from the JAMA Network, here are links to the most **viewed** and **discussed** articles of 2020.

### EVENTS AND SEMINARS

**NKI Alternative Careers Talk (ACT) Series**

The Nathan Kline Institute Community Building Committee is hosting a new monthly series on career trajectories, the NKI Alternative Careers Talk (ACT) series. The goal of this series is to provide scientists at all career levels – from undergraduates to research technicians to post-doctoral fellows – information on alternative careers in science and how these scientists made their career choices. Throughout the series we will bring in (through zoom calls) scientists in various careers such as government, industry, library sciences, data analysis, and more, who will discuss their career paths and how they made important life and career choices.

The NKI ACT began on February 8 and will run on the second Monday of each month at noon. Upcoming dates are March 8, April 12, and May 10.

The series will take place on the following zoom channel: [https://us02web.zoom.us/j/89540284886](https://us02web.zoom.us/j/89540284886)

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**.
NKI ON THE (VIRTUAL) ROAD

Dr. Robert Smith (Neurochemistry) presented two posters at the December 2020 virtual Annual Meeting of the American College of Neuropsychopharmacology. The poster titles were:

- Sulforaphane as a Treatment for Autism: A Randomized Double-Blind Study
- Efficacy of Add-On Sulforaphane for Improving Cognition and Symptoms in Frist-Episode Schizophrenia: A Randomized Double-Blind Study

NKI PUBLICATIONS UPDATE

Below is a list of references that have been added to the NKI publications database since the previous update. The full database contains over 6,500 items dating back to 1995, and can be searched from the myNKI website.


