BIOGRAPHICAL SKETCH

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NAME: Sjulson, Lucas

eRA COMMONS USER NAME (credential, e.g., agency login): SJULS01

POSITION TITLE: Assistant Professor of Psychiatry and Neuroscience

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Johns Hopkins University, Baltimore, MD	BA	05/99	Neuroscience
Weill Graduate School of Cornell University, New York, NY	PhD	05/07	Neuroscience
Weill Medical College of Cornell University, New York, NY	MD	05/08	Medicine
New York University School of Medicine, New York, NY	Residency	06/12	Psychiatry

A. Personal Statement

I am an Assistant Professor in the departments of Psychiatry and Neuroscience at Albert Einstein College of Medicine. 90% of my time is devoted to research, and my lab studies the neural basis of reward-guided decision-making, drug addiction, and motivated behavior using a broad range of approaches from molecular, systems, computational, and behavioral neuroscience. The long-term goals of this work are to uncover the mechanisms underlying decision-making and develop novel gene-based therapeutic approaches and closed-loop neurostimulation devices for the treatment of drug addiction. 10% of my time is devoted to clinical work, and my main interest is therapeutic neuromodulation, primarily involving psychiatric evaluation and management of patients who receive deep brain stimulators and brain lesioning procedures. I collaborate closely with the Department of Neurosurgery in treating these patients, and we are building a clinical infrastructure that I hope to use in the future for clinical trials of novel procedure-based interventions for substance use disorders.

B. Positions and Honors

Positions and Employment

2000-2008 Student, Cornell/Rockefeller/Sloan-Kettering Tri-Institutional MD/PhD Program. Thesis advisor: Gero Miesenböck. Thesis title: Two-Photon Imaging of a Genetically Encodable Voltage Sensor.
2008-2012 Resident Physician, NYU Department of Psychiatry.
2012-2013 Clinical Instructor, NYU Department of Psychiatry.
2013-2018 Research Assistant Professor, NYU Department of Psychiatry, NYU Department of Neuroscience and Physiology
2018-present Assistant Professor, Department of Psychiatry and Behavioral Sciences, Dominick P. Purpura Department of Neuroscience, Albert Einstein College of Medicine

Other Experience and Professional Memberships

Society for Neuroscience, 2000 – Present.
American Psychiatric Association, 2012 – Present.

Teaching Experience
Journal Club Tutor for Medical School Neuroscience Course, 2002 – 2003.
Psychopharmacology Supervisor for Psychiatry Residents, 2012 – 2018.
Neuroscience lecturer for Psychiatry Residents, 2012 – 2018.
Lecturer for psychiatry residents, addiction fellows, psychology interns, and PhD students, 2018 –

Honors
National Merit Scholar, 1995.
Elizabeth Glaser Pediatric AIDS Foundation Summer Fellowship, 1998.
Johns Hopkins University Honor Society for Neuroscience, 1998-1999.
Phi Beta Kappa, 1999.
Katherine Beineke Foundation Fellowship, 2003.
NIMH Outstanding Resident Award, 2010.
NYU Physician Scientist Training Program, 2012.
NYU KL2 Translational Research Scholars Program, 2013.
Leon Levy Neuroscience Fellowship, 2013.
SOBP Chair's Choice Award, 2019.

C. Contributions to Science

1. My recent work has focused on understanding the neural basis of drug addiction and developing novel translational strategies. One key project addressed the basis of cocaine conditioned place preference, finding that cocaine conditioning selectively strengthened inputs to the nucleus accumbens that arise from hippocampal place cells encoding the cocaine-paired location. This provided the first *in vivo* evidence suggesting that selective plasticity of specific subsets of connections may be the mechanism by which the brain stores drug-context associations, which are thought to drive relapse. A second project focused on the development of novel translational strategies for treating drug addiction, finding that chemogenetic manipulation of the nucleus accumbens was able to reduce alcohol consumption in a rodent model of binge drinking.

    a) **Sjulson L**, Peyrache A, Cumpelik A, Cassataro D, Buzsáki G. Cocaine place conditioning strengthens location-specific hippocampal coupling to the nucleus accumbens. *Neuron*. 2018 Jun 6;98(5):926-934. PMID: 29754750
    b) Cassataro D, Bergfeldt D, Malekian C, Van Snellenberg JX, Thanos PK, Fishell G, **Sjulson L**. Reverse pharmacogenetic modulation of the nucleus accumbens reduces ethanol consumption in a limited access paradigm. *Neuropsychopharmacology*. 2014 Jan;39(2):283-90. PMCID: PMC3870771.
    c) Cassataro, D., & **Sjulson, L**. (2015). The Use of DREADDs (Designer Receptors Exclusively Activated by Designer Receptors) in Transgenic Mouse Behavioral Models. In *Neuromethods: Designer Receptors Exclusively Activated by Designer Drugs* (Vol. 108, pp. 95–108). New York, NY: Springer New York.

2. My main PhD work focused on development and optimization of genetically encoded tools for fluorescent readout of membrane potential and optogenetic manipulation. I developed an optimized fluorescent voltage indicator that gave the largest fluorescence signal of any indicator at that time, performed some of the first in vivo voltage recordings with a genetically encoded indicator, and developed a rigorous biophysical framework for quantifying the theoretical and practical limits of voltage indicator performance with high speed two photon microscopy. I also collaborated with other lab members using two photon imaging to study the Drosophila olfactory system.

    a) **Sjulson L**, Miesenböck G. Rational optimization and in vivo imaging of a genetically encoded optical voltage reporter. *J Neurosci*. 2008 May 21;28(21):5582-93. PMCID: PMC2714581.
    b) **Sjulson L**, Miesenböck G. Optical recording of action potentials and other discrete physiological events: a perspective from signal detection theory. *Physiology*. 2007 Feb;22:47-55. PMID: 17289930.
    c) **Sjulson L**, Miesenböck G. Photocontrol of Neural Activity. *Chemical Reviews*. 2008 May;108(5):1588-602. PMID: 18447399.

d) Claridge-Chang A, Roorda RD, Vrontou E, **Sjulson L**, Li H, Hirsh J, Miesenböck G. Writing memories with light-addressable reinforcement circuitry. *Cell.* 2009 Oct 16;139(2):405-15.
e) Shang Y, Claridge-Chang A, **Sjulson L**, Pypaert M, Miesenböck G. Excitatory local circuits and their implications for olfactory processing in the fly antennal lobe. *Cell.* 2007 Feb 9;128(3):601-12.

3. Prior to my PhD, I worked as a lab technician studying the roles of matrix metalloproteases in HIV dementia.
   a) Vos C, Gartner S, Ransohoff RM, McArthur JC, Wahl L, **Sjulson L**, Hunter E, Conant K. Matrix Metalloprotease-9 Release from Monocytes Increases as a Function of Differentiation: Implications for Neuroimflammation and Neurodegeneration. *J Neuroimmunol.* 2000 Sep 22;109(2):221-7.
   b) Vos CMP, **Sjulson L**, Nath A, McArthur JC, Pardo CA, Rothstein JD, Conant K. Cytotoxicity by Matrix Metalloprotease-1 in Organotypic Spinal Cord and Dissociated Neuronal Cultures. *Exp Neurol.* 2000 Jun;163(2):324-30.
   c) Conant K, McArthur JC, Griffin DE, **Sjulson L**, Wahl LM, Irani DN. Cerebrospinal Fluid Levels of MMP-2, 7, and 9 are Elevated in Association with Human Immunodeficiency Virus Dementia. *Ann Neurol.* 1999 Sep;46(3):391-8.

Complete List of Publications in MyBibliography: https://www.ncbi.nlm.nih.gov/pubmed/?term=sjulson

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

DP1 DA051608 (NIDA Avenir Award) Sjulson (PI) 9/1/20 – 8/31/25
Title: **Uncovering links between neuronal transcriptomic and functional profiles in opioid addiction.**
This project aims to determine the functional role that transcriptomically distinct medium spiny neuron populations in the nucleus accumbens play in opioid-related behaviors.
Role: PI

Whitehall Foundation Sjulson (PI) 9/1/20 – 8/31/21
Title: **Hippocampus-accumbens coordination in linking rewards to past and future actions.**
The goal of this project is to determine how the distinct functional roles of evaluating past rewards and predicting future rewards are subdivided among neuronal subpopulations in the nucleus accumbens.
Role: PI

Peter McManus Charitable Trust Sjulson (PI) 1/1/21 – 12/31/21
Title: **Hippocampal coupling with accumbens subcircuits for storage and retrieval of opioid-context associations**
This project aims to determine how different neuronal subcircuits within the nucleus accumbens store and retrieve associations between opioid use and specific environmental contexts, which are known to be triggers for relapse.
Role: PI

Feldstein Medical Foundation Sjulson (PI) 7/1/21 – 6/30/22
Title: **Preclinical validation of a novel gene-based therapeutic strategy for opioid use disorder**
The goal of this project is to use rodent models to test a new chemogenetic strategy for treating opioid use disorder.

Completed Research Support

K08 DA036657 Sjulson (PI) 6/1/14 – 5/30/19
Title: **Accumbens neuronal subtypes in addiction.**
This project investigates the behavioral roles of GABAergic interneuron subtypes in the nucleus accumbens in addiction.
Role: PI

Brain and Behavior Research Foundation Sjulson (PI) 1/1/16 – 12/31/17
NARSAD Young Investigator Grant
This project investigates the role of selective plasticity between the hippocampus and nucleus accumbens in cocaine conditioned place preference.
Role: PI

Leon Levy Neuroscience Fellowship 11/1/13 – 11/1/15
The goal of the project is to explore the roles of striatal inhibitory interneurons in addiction.
Role: PI

NYU Physician Scientist Training Program 7/1/12 – 12/30/13
The goal of this project is to develop knowledge of translational aspects of research, with a focus on genetically encoded neuromodulation technology for the treatment of addiction.
Role: PI

NYU KL2 Translational Research Scholars Program 4/1/13 – 5/30/14
NCATS UL1 TR000038

The goal of this project is to identify cell populations in the brain that may be candidates for targeted gene-based treatments for addiction.
Role: PI