

SungJun Cho

29, 254 Jukjeon-ro, Suji-gu, Yongin, Republic of Korea (16877)

✉ scho20@uchicago.edu 🏠 scho97.github.io 🔗 github.com/scho97 📞 +82-10-9926-4853

Education

The University of Chicago

Chicago, IL

B.A. in Philosophy

2020

B.S. in Neuroscience

2020

Advisor: Wim van Drongelen

Thesis: Theoretical modeling of neuronal networks: Paroxysmal depolarization and ictal wave propagations in focal epileptic seizures

Research Interests

My research interest lies broadly in **computational cognitive neuroscience**, especially in neuropsychiatry, decision making, learning and memory, and mathematical / logical cognition. **Methodologies** of interest include mathematical modeling, electrophysiology and neuroimaging, signal processing, and machine learning.

Employment

Jee Lab | Korea Institute of Science and Technology

Seoul, South Korea

Postgraduate Researcher, Prof. Jee Hyun Choi

Jul 2020 - Present

- Studying behavioral correlates of neural oscillations in mouse basal forebrain, concentrating on the relationship between open-field behaviors and physiological characteristics of gamma burst
- Investigating frequency-specific links between animal behaviors and neural activities in the prefrontal-amygdala circuits during learning and anxiety-based cognitive tasks using computer vision approaches
- Identifying the intrinsic frequency and associated resonance phenomena in the basolateral amygdala based on *in vivo* optogenetic stimulation

Research Experience

van Drongelen Epilepsy Lab | The University of Chicago

Chicago, IL

Undergraduate Research Assistant, Prof. Wim van Drongelen

Oct 2018 - Jun 2020

- Modeling Neuronal Dynamics 🔗
 - Theoretically modelled ictal machinery of the focal epileptic seizure based on the reduced Hodgkin-Huxley formalism to investigate the effect of paroxysmal depolarization shift in parvalbumin inhibitory interneurons
- Amplitude-Integrated EEG Signal processing
 - Participated in developing new algorithms to enhance the aEEG analysis protocol currently used in the neonatal intensive care unit at the University of Chicago Medical Center.
- Biosignal Data Analysis 🔗
 - Wrote and edited codes for the analysis of mouse breathing data and the respiratory signals measured from medullary neurons

Brain Dynamics Lab | The University of Chicago

Chicago, IL

Undergraduate Research Assistant, Prof. Stephanie Cacioppo

Nov 2018 - Jun 2020

- The Effect of Flibanserin on the Female Brain
 - Managed acquisition, preprocessing, and analysis of ERP data of the control subjects and female hypoactive sexual desire disorder (HSDD) patients to investigate the changes in brain activities rendered by Flibanserin

- Neural Differences in HSDD

- Identified menopause-dependent neural activation differences in HSDD patients by analyzing spatiotemporal dynamics of the high-performance electrical neuroimaging data

Clinical Cognitive Neuroscience Center | Seoul National University

Seoul, South Korea

Undergraduate Visiting Scholar, Prof. Jun Soo Kwon

Jul 2018 - Sep 2018

- Network Connectivity in Schizophrenia

- Studied structural connectivity characterizing hippocampal-medial prefrontal circuitry of the controls and schizophrenic patients by constructing diffusion tractographies based on the open-source DTI data
- Researched the application of graph theory and dynamic causal modeling to the studies on functional and effective connectivity of corticothalamic and corticolimbic pathways

Impression Formation Social Neuroscience Lab | The University of Chicago

Chicago, IL

Undergraduate Research Assistant, Prof. Jasmin Cloutier and Jennifer Kubota

Nov 2016 - Jul 2017

- Visual Perceptive Study

- Managed human-interactive behavioral tasks and collected data to investigate how people internally perceive and evaluate the social status of others based on one's prejudice when given visual stimuli from two different status dimensions, i.e. dominance and prestige

- Race & Status Study

- Analyzed data and participated in writing a paper on how external motivation to respond without prejudice alters the neural processing of attention and decision making in response to the individuals' perceived race and status

Cognitive Neurology and Dementia Lab | Samsung Medical Center


Seoul, South Korea

Clinical Intern & Research Assistant, Prof. DukRyul Na


Jul 2015 - Aug 2015

- Participated in conducting cognitive function tests (K-MMSE & SNSB) to diagnose cognitive impairments in Alzheimer's disease (AD) patients
- Assisted a project on studying the intra-arterial administration of mesenchymal stem cells on transgenic AD mice (learned western blot, cell culture, ELISA, genotyping, mouse brain slice preparation, and SPSS)
- Executed an individual clinical project titled: The educational effect of a lifestyle modification on the body mass index in patients with memory complaints: A single center experience (supervised by Dr. Jinsan Lee)

Peer-Reviewed Publications

- [1] Tryba A.K., Merricks E., Lee S., Pham T., **Cho S.J.**, Nordli Jr. D.R., Eissa T.L., Goodman R., McKhann G., Emerson R., Schevon C., & van Drongelen W. (2019). The role of paroxysmal depolarization in focal seizure activity. *Journal of Neurophysiology*, 122(5): 1861-1873. 

Posters & Conferences

- [1] **Cho S.J.**, Siewsrichol W., Cacioppo S. (2020). Neural Differences in Hypoactive Sexual Desire Disorder: An ERP Microstate Study. *Cognitive Neuroscience Society 2020*. 
- [2] van Drongelen W., Tryba A.K., Pham T., Merricks E., Bhansali A., Pesce L., **Cho S.J.**, Lee S., Eissa T.L., Nordli Jr. D.R., & Schevon C.A. (2019). Dynamics sustaining focal seizures: a dual function of inhibition and interactions across scales. *Society for Neuroscience 2019*.

Honors & Fellowship Awards

Dean's Fund for Undergraduate Research - Conference (for HSDD research)	2020
Micro-Metcalf Internship Award (for phonology research)	2020
Liew Family College Research Fellowship (for pediatric epilepsy research)	2019
Jeff Metcalf Internship (for pediatric epilepsy research)	2018-19
Dean's List (3x times)	2016-19

Teaching Experience

VCA Course Assistant, MATH 15200 Calculus II	Autumn '19
Teaching Assistant (Lecture & Lab), BIOS 10130 Core Biology (Nervous System)	Spring '18

Academic Experience

Phonology Laboratory, Department of Linguistics, The University of Chicago	2020
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- Designed and implemented an online experiment to study the relationship between pitch and voice onset time (VOT) under the context of human speech perception.

Directed Reading Program, Department of Mathematics, The University of Chicago	2019
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- Studied persistent homology and its application to the field of neuroscience and computer science under the context of algebraic topology

Physician Shadowing Program, The University of Chicago Medicine	2018-19
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- Shadowed Prof. Helene Rubeiz at the Department of Neurology and Prof. Nishant Agrawal at the Department of Surgery, observing various neuromuscular diseases and otolaryngology surgeries
- Visited operating room under the guidance of Prof. Ross Milner (1/23/19): Endovascular Abdominal Aneurysm Repair (EVAR) of renal arteries

Skills

Programming Language: MATLAB, Python (TensorFlow, Keras, OpenCV), HTML/CSS/JavaScript

Research Software: ImageJ, Microsoft Excel, FSL (Freesurfer / MRtrix), LaTeX, NetStation, Brainstorm

Online Research Platform: Qualtrics, Amazon MTurk, GitHub

Experimental Skills: stereotactic surgery, optogenetics, histology, EEG

Online Courses: Deep Learning with TensorFlow (edWith), Introduction to Logic (Coursera)

Language: Korean (Native), English (Fluent), Mandarin Chinese (Upper-intermediate)

- UChicago Advanced Language Proficiency Certificate in Chinese: High Pass with Honors
- HSK (Chinese Proficiency Test) Level 6

Photography: DSLR, Digital Printing, Adobe Lightroom/Photoshop/Illustrator, 35mm film

References

Wim van Drongelen, Ph.D.

Professor

Department of Pediatrics, Neurology &

Computational Neuroscience

The University of Chicago

✉ wvandron@peds.bsd.uchicago.edu

🔗 Research Profile

Stephanie Cacioppo, Ph.D.

Assistant Professor

Department of Psychiatry and Behavioral

Neuroscience

The University of Chicago Pritzker School of Medicine

✉ scacioppo@bsd.uchicago.edu

🔗 Brain Dynamics Laboratory

Jee Hyun Choi, Ph.D.

Professor

Department of Neuroscience

KIST School, University of Science and Technology

✉ jeechoi@kist.re.kr

🔗 Laboratory of Computational, Cognitive
& Systems Neuroscience