Na Young **Jun**

nayoungjun.github.io | nayoung.jun@duke.edu | Google Scholar | nayoung_jun | nayoungjun

Employment

Meta Reality Labs — Burlingame, CA
Research Scientist Intern (CTRL team) - computational modeling — May 2022 - Aug 2022
- Built machine learning models for EMG-based neuromotor interfaces

Neuromatch Academy Deep Learning — Global
Lead Teaching Assistant — 2021
- Taught various topics on deep learning to professors, postdocs, and grad students, and led discussion sessions.

Education

Duke University — Durham, NC
Ph.D. in Neurobiology (expected Dec 2022, GPA 3.84/4.00) — Aug 2017 - Dec 2022
M.S. in Computer Science (en-route, GPA 3.95/4.00)

Yale University — New Haven, CT
M.S. in Bioengineering (GPA 3.63/4.00, received Mogam Science Foundation Scholarship) — Aug 2014 - May 2015

Korea University — Seoul, S. Korea
B.S. in Life Sciences (GPA 3.60/4.00, received Korea University Academic Scholarship) — Mar 2009 - July 2014
Student Exchange at University of Wisconsin-Madison (received Mirae Asset Scholarship)

Selected Publications

Efficient coding, channel capacity, and the emergence of retinal mosaics — 2022
Na Young Jun, Greg D. Field, John Pearson in *In Press*

Scene statistics and noise determine the relative arrangement of receptive field mosaics — 2021
Na Young Jun, Greg D. Field, John Pearson in *PNAS*

Inter-Mosaic Coordination of Retinal Receptive Fields — 2021
Suva Roy, **Na Young Jun**, Emily Davis, John Pearson, Greg D. Field in *Nature*

Bubblewrap: Online tiling and real-time flow prediction on neural manifolds — 2021
Anne Draelos, Pranjal Gupta, **Na Young Jun**, Chaichontat Sriworarat, John Pearson, in *NeurIPS*

Coordinated multiplexing of information about separate objects in visual cortex — 2019
Na Young Jun, Douglas A Ruff, Lily E. Kramer, Brittany Bowes, Surya T Tokdar, Marlene R Cohen, Jennifer M Groh, in *bioRxiv (under review)*

Channelrhodopsin Variants Engage Distinct Patterns of Network Activity — 2018
Na Young Jun and Jessica A. Cardin, in *eNeuro*

Conference Presentations

Efficient Coding of Natural Movies Predicts the Optimal Number of Receptive Field Mosaics — 2022
Na Young Jun, Greg Field, John Pearson in *Cosyne*

The Influence of noise and information non-uniformity on the efficient coding of natural scenes — 2020
Na Young Jun, Greg Field, John Pearson in *Cosyne*

Fluctuating Activity (Time-Division Multiplexing) Varies Across Sensory Brain Regions — 2018
Na Young Jun, Jeff Mohl, Marlene Cohen, Surya Tokdar, Jennifer Groh, in *Society for Neuroscience*

Optogenetic Tools With Varying Kinetics Differentially Engage Intrinsic Network Resonance *In Vivo* — 2016
Na Young Jun and Jessica A. Cardin, in *Society for Neuroscience*

Invited Talks

Efficient coding of natural scenes predicts the optimal number of receptive field mosaics and their spatial arrangements. — Daejeon, Korea
Human-Powered Healthcare Webinar Series, KAIST — 2022

The optimal spatial arrangement of ON and OFF receptive fields — Seoul, Korea
Physiology Monthly Seminar, School of Medicine, Korea University — 2022

Optimal Spatial Arrangement of ON and OFF Encoders in the Noisy World: Under the Perspective of Information Efficiency — Durham, NC
Neurobiology Graduate Students Seminar, Duke University — 2020

Observe the Unobserved: Inferring Hidden Structure in Multilayer Neural Circuits — Durham, NC
Neurobiology Graduate Students Seminar, Duke University — 2018

Novel Optogenetic Tools for Probing Network Activity in the Intact Brain — New Haven, CT
Biomedical Engineering Master's graduation talk, Yale University — 2015

Research Experience

Field Lab (PI: Greg Field) & Pearson Lab (PI: John Pearson), Duke University — Durham, NC
Doctoral Thesis Research — Jul 2018 - Present

- Computational understanding of retinal information processing using deep learning networks and information theory.
- Built a model of the retina using neural networks, optimized using the efficient coding principle on natural video inputs.
- The model provides a unified perspective on the relationship between retinal mosaics, efficient coding, and channel capacity that may help to explain the stunning functional diversity of retinal mosaics.
- published multiple papers in Nature, PNAS, and NeurIPS.

Groh Lab (PI: Jennifer Groh), Duke University — Durham, NC
First year Ph.D. rotations — Apr 2018 - Jun 2018

- Studied patterns of neural correlations and time-division multiplexing in visual cortex (V1, V4) with respect to the number of objects in the visual field.

Grill Lab (PI: Warren Grill), Duke University — Durham, NC
First year Ph.D. rotations — Jan 2018 - Apr 2018

- Single-unit recordings of Parkinsonian Rat brain during DBS stimulation to understand how DBS affects brain plasticity.

Kay Lab (PI: Jeremy Kay), Duke University — Durham, NC
First year Ph.D. rotations — Sep 2017 - Jan 2018

- Live-imaging of microglial function in the retina.

Demb Lab (PI: Jonathan B. Demb), Yale University — New Haven, CT
Postgraduate Research Associate — Jul 2015 - Aug 2017

- Characterized new cell types in the mouse retina based on their structure, function and gene expression.

Cardin Lab (PI: Jessica A. Cardin), Yale University — New Haven, CT
Master's Thesis Research — Aug 2014 - May 2015

- Studied spontaneous and activated optogenetic tool-induced gamma oscillations in the mouse visual cortex *in vivo*.
- Injected several novel optogenetic tools (Chrimson, Chronos, SwiChR) and Channelrodopsin2 to the V1 cortex of mice brain and compared their *in vivo* activation, and conducted extracellular recording to compare spike rates and local field potential between mice with different optogenetic tools.

Advanced Computational Vision (Instructor: Steven Zucker), Yale University — New Haven, CT
Class Final Project — Jan 2015 - May 2015

- Trained neural signal classifiers that distinguish between brain states (awake or anesthetized, moving or not moving, receiving visual stimuli or not) and which cortex layers the neural signal originated.

Skills

Programming	PyTorch, Python, MATLAB, Java, R
Biological Experiments	Electrophysiology (intracellular / extracellular neural recording), animal behavior, IHC