Clayton Seitz

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SUMMARY

I have previously worked on a mathematical and biophysical description of the relationship between dynamics and structure in recurrent networks of integrate and fire neurons. However, more generally, I investigate statistical inference and memory formation in artificial neural networks. I am particularly interested in a Bayesian interpretation of neural dynamics and the neural sampling hypothesis, which provide a rich framework for investigating information transmission, storage, and compression by neurons. Much of this work utilizes techniques derived from physics, information theory, and statistics. I am also interested in the development and application of a broad class of machine learning algorithms for biological applications e.g., stochastic optimization, generative modeling, and computer vision.

EDUCATION

Master of Science, Biophysics
University of Chicago, Chicago, IL, 2021
Thesis: *Towards a theory of stable cell assembly formation in excitatory-inhibitory neuronal networks*

Bachelor of Science, Magna Cum Laude, Physics
Purdue University, Indianapolis, IN, 2019
Minor: Mathematics

Bachelor of Science, Magna Cum Laude, Informatics
Luddy School of Informatics, Computing, and Engineering, Indiana University Bloomington, 2019
Concentration: Mathematics

COMPUTER SKILLS

Languages & Software: Python, Tensorflow, C, Git, LaTeX, Bash

EXPERIENCE

Research Technician 2019-2021
Indiana University - Purdue University, Indianapolis, IN
- Develop an image processing software pipeline for high-throughput quantification of images in fluorescence microscopy
- Utilize high performance computing clusters for image segmentation, single particle tracking, and image registration

Undergraduate Researcher 2019-2020
Indiana University - Purdue University, Indianapolis, IN
- Utilize time-correlated single photon counting (TCSPC) to characterize the sub-Poissonian emission of organic quantum dots dispersed in a thin film of poly-methyl methacrylate (PMMA)
- Design and utilize a 3-color imaging protocol to perform single-molecule imaging of mRNA transcripts in human epithelial kidney and osteosarcoma cells

Undergraduate Tutor 2018-2019
Indiana University - Purdue University, Indianapolis, IN

- Tutored undergraduate students in introductory physics courses covering classical mechanics, classical electromagnetism, circuit analysis, and modern physics

AWARDS

PS-ON Annual Investigator Meeting Travel Award   2019
Indiana University - Purdue University, Indianapolis, IN

Hudson and Holland Scholarship for Diversity and Inclusion   2013-2017
Indiana University, Bloomington, IN

Founders Scholar   2013-2017
Indiana University, Bloomington, IN

Cigital Scholarship   2016-2017
Indiana University, Bloomington, IN

Deans List   2013-2019
Indiana University, Bloomington, IN

PUBLICATIONS Wenting Wu, Farooq Syed, Edward Simpson, Chih-Chun Lee, Jing Liu, Garrick Chang, Chuanpeng Dong, Clayton Seitz, Decio L. Eizirik, Raghavendra G. Mirmira, Yunlong Liu, Carmella Evans-Molina; Impact of Proinflammatory Cytokines on Alternative Splicing Patterns in Human Islets. Diabetes 1 January 2022; 71 (1): 116127

Mengdi Zhang, Clayton Seitz, Garrick Chang, Fadil Iqbal, Hua Lin, and Jing Liu *A guide for single-particle chromatin tracking in live cell nuclei.* Cell Biology International (In Review).