

# Clayton Seitz

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cwseitz.github.io

## SUMMARY

My research primarily consists of the application high-dimensional stochastic methods, information theory, and Bayesian statistical inference to problems related to digital image processing and unsupervised learning of gene interaction networks. This sometimes involves algorithm development at the level of model inference from data which can require optimization of deep networks and/or graphical models. I am primarily familiar with optimization algorithms inspired by physics e.g., Langevin dynamics, MCMC, and simulated annealing. I am also interested in the implementation of statistical inference in the dynamics of recurrent networks of integrate and fire neurons. This is a Bayesian interpretation of neural dynamics and neural sampling, inspired by the Boltzmann machine.

In my personal life, I like to write music and digital signal processing software for audio effects. Also, I like to tinker with vintage vacuum tube amplifiers and occasionally do some woodworking.

## 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

*Dean's 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): 116–127

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).