

Clayton Seitz

cwseitz@iu.edu
cwseitz.github.io

SUMMARY

Broadly interested in the theory and applications of scalable Bayesian inference methods for high-dimensional biological systems - particularly scalable variants of MCMC. This involves a broad range of theoretical tools derived from physics, information theory, stochastic processes, and Bayesian statistics. Here are a couple of biological applications I work on:

- Using statistical inference to probe structural properties of neural microcircuits, either in-silico or in-vivo, using calcium imaging data.
- Bayesian methods for inferring the kinetics of transcription and RNA and protein transport during the immune response

I also have a general interest in high throughput tissue imaging for high-content screens of the tumor microenvironment during cancer immunotherapy

EDUCATION

Doctor of Philosophy, Physics

Purdue University, West Lafayette, IN, 2024

Thesis: Scalable Bayesian inference algorithms for inhomogeneous Poisson processes in systems biophysics

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, R, PyTorch, C, Git, LaTeX, Bash, Linux

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

Maelle Locatelli[†], Josh Lawrimore[†], Hua Lin[†], Sarvath Sanaullah, Clayton Seitz, Dave Segall, Paul Kefer, Salvador Moreno Naike, Benton Lietz, Rebecca Anderson, Julia Holmes, Chongli Yuan, George Holzwarth, Bloom Kerry, Jing Liu, Keith D Bonin, Pierre-Alexandre Vidi. *DNA damage reduces heterogeneity and coherence of chromatin motions*. PNAS. 2022

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. January 2022.

Wenting Wu, Farooq Syed, Edward Simpson, Chih-Chun Lee, Jing Liu, Garrick Chang, Chuanpeng Dong, Clayton Seitz, Decio L. Eizirik, Raghavendra G. Mir-mira, Yunlong Liu, Carmella Evans-Molina; *Impact of Proinflammatory Cytokines on Alternative Splicing Patterns in Human Islets*. Diabetes 1 January 2022; 71 (1): 116–127