Clayton Seitz

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SUMMARY

Broadly interested in the theory and applications of scalable statistical inference methods for high-dimensional systems. Particularly Bayesian methods which report uncertainty e.g., MCMC. Here are a couple of biological applications I work on:

(1) Using statistical inference to probe structural properties of neural microcircuits, either in-vivo or in-silico. This involves a broad range of theoretical tools derived from physics, information theory, stochastic processes, and Bayesian statistics.

(2) Bayesian methods and dimensionality reduction to study heterogeneity of the transcriptome in triple negative breast cancer and its association with the immune response. Inference applied to single-cell high throughput sequencing data allows us to identify biomarkers in tumors which can then be visualized in their native spatial context using high-throughput fluorescence imaging.

EDUCATION

Doctor of Philosopy, Physics
Purdue University, West Lafeyette, IN, 2024
Thesis: *In progress*

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

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. 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