

Clayton Seitz

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PERSONAL STATEMENT

I specialize in the research and application of general probabilistic models and deep generative models for computer vision and biological discovery. I have primarily applied these frameworks to advancing super-resolution fluorescence microscopy of so-called nucleosome nanodomains, and have published on this topic in high-impact scientific journals.

EDUCATION

Doctor of Philosophy, Physics

Indiana University, Indianapolis, IN

Thesis: *Advancing super-resolution microscopy for quantitative in-vivo imaging of chromatin nanodomains*

Master of Science, Biophysics

University of Chicago, Chicago, IL, 2021

Thesis: *Stable cell assembly formation in excitatory-inhibitory neural networks*

Bachelor of Science, Physics, Magna cum laude

Indiana University, Indianapolis, IN, 2019

Minor: Mathematics

Bachelor of Science, Informatics, Magna cum laude

Luddy School of Informatics, Computing, and Engineering, Indiana University Bloomington, 2019

Concentration: Mathematics

RESEARCH EXPERIENCE

Graduate Research Assistant

2022-Present

Indiana University, Indianapolis, IN

- Design deep generative models for enhancing super-resolution fluorescence microscopy
- Implement direct stochastic optical reconstruction microscopy (dSTORM) for super-resolution imaging of chromatin in living cell nuclei
- Investigate the impact of mutations in epigenetic proteins on chromatin structure in living cell nuclei experimentally and complement experimental data with molecular dynamics simulations

Graduate Trainee

2020-2022

University of Chicago, Chicago, IL

- Utilize fluorescence microscopy to measure temporal dynamics of calcium concentration in single cells
- Generate Monte Carlo simulations of spiking neural networks to relate network architecture to spiking dynamics

Undergraduate Research Assistant

2019-2020

Indiana University, Indianapolis, IN

- Develop an image processing package in Python for processing large volumes of images generated by fluorescence microscopy

- 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)

AWARDS	<i>NIH Graduate Training Fellowship</i> University of Chicago, Chicago, IL	2020
	<i>Travel Award and Lightning Talk Invitation</i> Physical Sciences in Oncology - Minneapolis, MN	2019
	<i>Hudson and Holland Scholarship for Diversity and Inclusion</i> Indiana University, Bloomington, IN	2013-2017
	<i>Founders Scholar</i> Indiana University, Bloomington, IN	2013-2017
	<i>Digital Scholarship</i> Indiana University, Bloomington, IN	2016-2017

PUBLICATIONS **Clayton Seitz**[†], Donghong Fu[†], Mengyuan Liu, Hailan Ma, and Jing Liu. *BRD4 phosphorylation regulates the structure of chromatin nanodomains*. In Review. 2024

Clayton Seitz and Jing Liu. *Uncertainty-aware localization microscopy by variational diffusion*. In Review. 2024

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 12 July 2022; 119 (29): 1-11

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 15 January 2022; 46 (5): 683-700

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 25 October 2021; 71 (1): 116-127

Clayton Seitz, Hailan Ma, and Jing Liu. *Bayesian analysis of GBP5 transcriptional bursts*. Biophysical Society Annual Conference 2022

Clayton Seitz, Hua Lin, Keith Bonin, Pierre-Alexandre Vidi, and Jing Liu. *Quantifying the spatiotemporal dynamics of dUTP labeled chromatin during the DNA damage response*. Biophysical Society Annual Conference 2020

TECHNICAL SKILLS	<i>Programming Languages & Software</i> : Python, R, PyTorch, C, Git, LaTeX, Bash
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