

Clayton Seitz

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PERSONAL STATEMENT

I maintain a diverse academic background and specialize in the development of probabilistic models, including deep generative models, for biological discovery and computer vision. I have previously used cutting-edge modeling techniques to study the interaction of epigenetic proteins with nucleosome nanodomains and validated findings experimentally using super-resolution fluorescence microscopy.

EDUCATION

Doctor of Philosophy, Physics

Indiana University

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

Master of Science, Biophysics

University of Chicago

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

Bachelor of Science, Physics, Magna Cum Laude

Indiana University

Minor: Mathematics

Bachelor of Science, Informatics, Magna Cum Laude

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

Concentration: Mathematics

RESEARCH EXPERIENCE

Graduate Research Assistant

2022-Present

Indiana University, Indianapolis, IN

- Designed diffusion models/score-based generative models and general convolutional networks for computer vision tasks in super-resolution fluorescence microscopy
- Investigated the impact of point mutations of epigenetic proteins on the structure of nucleosome nanodomains and complement experimental data with molecular dynamics simulations
- Developed novel microscopy systems for super-resolution imaging of living cells

Graduate Trainee

2020-2022

University of Chicago, Chicago, IL

- Utilized fluorescence microscopy to measure temporal dynamics of calcium concentration in MIN6 cells
- Performed Monte Carlo simulations of spiking cellular networks to relate network architecture to spiking dynamics

Undergraduate Research Assistant

2019-2020

Indiana University, Indianapolis, IN

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

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

PUBLICATIONS	Clayton Seitz [†] , Donghong Fu [†] , Mengyuan Liu, Hailan Ma, and Jing Liu. <i>BRD4 phosphorylation regulates the structure of chromatin nanodomains</i> . In Review. 2024	
	Clayton Seitz and Jing Liu. <i>Uncertainty-aware localization microscopy by variational diffusion</i> . 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. <i>DNA damage reduces heterogeneity and coherence of chromatin motions</i> . PNAS 12 July 2022; 119 (29): 1-11	
	Mengdi Zhang, Clayton Seitz , Garrick Chang, Fadil Iqbal, Hua Lin, and Jing Liu. <i>A guide for single-particle chromatin tracking in live cell nuclei</i> . 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; <i>Impact of Proinflammatory Cytokines on Alternative Splicing Patterns in Human Islets</i> . Diabetes 25 October 2021; 71 (1): 116-127	
	Clayton Seitz , Hailan Ma, and Jing Liu. <i>Cytokine-induced transcriptional memory is evident in the kinetics of transcriptional bursts</i> . Biophysical Society Annual Conference 2022	
TECHNICAL SKILLS	Clayton Seitz , Hua Lin, Keith Bonin, Pierre-Alexandre Vidi, and Jing Liu. <i>Quantifying the spatiotemporal dynamics of dUTP labeled chromatin during the DNA damage response</i> . Biophysical Society Annual Conference 2020	
	Programming Languages & Software: Python, R, PyTorch, C/C++, Git, LaTeX, Bash, HPCs/SLURM	