

# Clayton Seitz

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cwseitz.github.io

## RESEARCH INTERESTS

I combine deep learning with Bayesian statistics to achieve precise 3D localization microscopy *in vitro*. In particular, I have combined deep image models for image restoration with stochastic gradient langevin dynamics to achieve reconstructions of nuclear protein complexes with sub 10-nanometer resolution. This involves a broad array of theoretical tools from statistical physics, information theory, and optics. Currently I am applying these models to study nucleosome organization and phase transitions of DNA-protein condensates during the immune response.

## EDUCATION

*Doctor of Philosophy*, Physics  
Purdue University, Indianapolis, IN, 2024  
Thesis: *Untitled*

*Master of Science*, Biophysics  
University of Chicago, Chicago, IL, 2021  
Thesis: *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 Assistant* 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 Research Assistant* 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

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

<b>PUBLICATIONS</b>	Maelle Locatelli <sup>†</sup> , Josh Lawrimore <sup>†</sup> , Hua Lin <sup>†</sup> , Sarvath Sanaullah, <b>Clayton Seitz</b> , 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. 2022
	Mengdi Zhang, <b>Clayton Seitz</b> , 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. January 2022.
	Wenting Wu, Farooq Syed, Edward Simpson, Chih-Chun Lee, Jing Liu, Garrick Chang, Chuanpeng Dong, <b>Clayton Seitz</b> , Decio L. Eizirik, Raghavendra G. Mir-mira, Yunlong Liu, Carmella Evans-Molina; <i>Impact of Proinflammatory Cytokines on Alternative Splicing Patterns in Human Islets</i> . Diabetes 1 January 2022; 71 (1): 116–127
	<b>Clayton Seitz</b> , 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
	<b>Clayton Seitz</b> , 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> . Physical Sciences in Oncology Annual Conference 2019
	<b>Clayton Seitz</b> , Andrew Reeser, Fangjia Li, and Jing Liu. <i>Machine learning methods in image based transcriptomics at single molecule resolution</i> . Biophysical Society Annual Conference 2019