

Clayton Seitz

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RESEARCH INTERESTS

My research is interdisciplinary and problem-oriented. I am currently developing novel methods for fast super-resolution microscopy to image the epigenetic landscape in living mammalian cell nuclei. I also have a healthy interest in deep probabilistic models, particularly diffusion models and their application in image restoration and *de novo* drug design.

EDUCATION

Doctor of Philosophy, Physics
Purdue University, Indianapolis, IN, 2024
Thesis: *Advancing super resolution microscopy for quantitative imaging of chromatin nanodomains*

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

SOFTWARE SKILLS

Python, PyTorch, C/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

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>Cigital Scholarship</i> Indiana University, Bloomington, IN	2016-2017

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

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

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*. Physical Sciences in Oncology Annual Conference 2019

Clayton Seitz, Andrew Reeser, Fangjia Li, and Jing Liu. *Machine learning methods in image based transcriptomics at single molecule resolution*. Biophysical Society Annual Conference 2019