

# Nick Lauersdorf

Computational Physicist and Data Scientist

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## Social Network

 $R^{G}$ 

ResearchGate Profile



Github Profile



LinkedIn Profile

# Languages

Python
BASH
BASH

MATLABC++MATLAB

F HTML CSS

Javascript

SQL SQL

## Tools

HOOMD-BlueMicrosoft OfficeNumpySciPy

Matplotlib

Mathematica

Model Development Tableau

Tableau • • •

Scikit-learn
Seaborn

O Pytorch
Tensorflow

dj Django

## **Objective**

Computational Physicist seeking to apply 9-years of modeling and simulation, data science, and software development experience to a career in industry. Extensive experience developing physics-based models, writing algorithms to statistically analyze big data, and designing intuitive visualizations to share significant findings.

### Education

PhD in Materials Science | UNC-Chapel Hill

2019 - Spring 2024

- Graduate business certificate in Innovation, Leadership, & Management
- Fully paid for 3-years of graduate career by winning the Department of Defense (DoD) National Defense Science & Engineering Graduate (NDSEG) Fellowship

B.S. in Physics and Mathematics | UW-Madison

2014 - 2018

• GPA: 3.60

## Experience

### Research & Programming

Computational Physicist | UNC-Chapel Hill

2020 - current

- Discovered meta-stable states of phase separation (clustering) for active Brownian particle mixtures via C++ molecular dynamics simulations [1]
- Determined phase boundary between stable and meta-stable clusters by training logistic regression machine learning model [2]
- Allowed differentiation of bulk and interface of cluster by writing local translational and orientational order-based clustering algorithm
- Enabled design of non-equilibrium steady-states by deriving predictive statistical mechanics theory [4]

### Data Scientist | BeAM Makerspaces

2019 - 2021

- Enabled cost-efficient scheduling and targeted marketing by developing Tableau workbooks for statistical analysis of makerspace user demographics
- Improved end-user experience of staff by leading beta testing of user analytics software
- Increased monthly first-time users by 15% by designing marketing visualizations for UNC's websites and within every UNC makerspace
- Led team that created and implemented a campus-wide inventory tracking system and database

### Experimental Physicist | UNC-Chapel Hill

2019 - 2020

- Expanded lab's presence by forming and managing a collaboration network with numerous national labs
- Enabled detection of harmful materials by developing first narrow-band perovskite photodetector for photo-luminescence measurements [5]
- Taught photodetectors to developing scientists by publishing textbook chapter [3]

Assistant Scientist | Pharmaeutical Product Development 2018 – 2019

• Increased customer satisfaction by writing FDA-regulated reports

### Computational Physicist | UW-Madison

2015 - 2018

- Enabled accurate prediction of fusion plasma properties by developing a Bayesian statistics model in Python
- $\bullet$  Increased efficiency of model by 40% through converting iterations over lists to multi-dimensional tensor mathematics
- Enabled user-friendly design of x-ray detector optics by developing multi-variable optimization routines to maximize signal
- Increased measurement capabilities of scientists by designing x-ray detector that removes undesirable noise from measurements [6]

#### Teaching & Mentoring

Mentor | Junior Science & Humanities Symposium (JSHS) 2022 – current

- Accomplished machine learning, computer vision, and data science research projects by mentoring high school students
- Earned \$8,000 for two mentees' college funds by placing second at JSHS nationals
- Competed at finals for International Science & Engineering Fair (largest precollege STEM competition in world)

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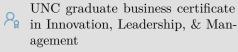
# Operating Systems -

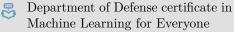


### Interests



## Certificates -





# Memberships

- American Physical Society
   2016 current
- Materials Research Society
   2019 current
- Graduate Student Government - 2020 - 2021
- Graduate Student Association - 2021 - current

#### Teaching Assistant | UNC-Chapel Hill

- 2020 2021
- Introduced others to programming by leading lectures on MATLAB and Python
   Designed molecular dynamics models by overseeing semester-long research projects

#### Service & Outreach

#### Founder | Graduate Student Association

2021 - current

- Connected graduate students during pandemic by planning social events
- Advocated for student rights by co-developing department curriculum
- Empowered students by organizing career development talks with established PhD professionals

### Senator | Graduate Student Government

2020 - 2021

- Elected by peers to serve on senate and finance committee
- Provided financial support to minority-serving outreach organizations and remote students during pandemic by writing and arguing for bills

### **Publications**

- 1. **Lauersdorf, N.**, et al. Activity-based Segregation in Binary Active Mixtures. (In Preparation)
- 2. Lauersdorf, N., et al. Programmable Binary Active Mixtures. (In Preparation)
- 3. Lauersdorf, N., et al. Perovskites Enabled Highly Sensitive and Fast Photodetectors. Perovskite Photovoltaics and Optoelectronics: From Fundamentals to Advanced Applications 383-409, edited by Tsutomu Miyasaka (2022).
- 4. **Lauersdorf, N.**, et al. Phase behavior and surface tension of soft active Brownian particles. *Soft Matter* 17, 6337-6351 (2021).
- Wolanyk, J., Xiao, X., Fralaide, M., Lauersdorf, N., et al. Tunable perovskite-based photodetectors in optical sensing. *Actuators, B Chem.* 320, 128462 (2020).
- 6. Lauersdorf, N., et al. Development of a Ross Filter Based Aluminum Line Radiation (NickAl2) Detector in Madison Symmetric Torus. *Internally published by UW-Madison*. (2018).

### Presentations

I have **presented at 25 conferences and seminars**, including six national conferences.

- Programmable Binary Active Mixtures. **Oral and poster presentation** at the 4th Annual NDSEG Fellows Conference (Aug. 2023)
- Programmable Binary Active Mixtures. **Oral presentation** at the *American Physical Society March Meeting* (Mar. 2023)
- Surface Tension of Soft Active Brownian Particles. **Oral presentation** at the *American Physical Society March Meeting* (Mar. 2022)
- Phase Behavior and Surface Tension of Soft Binary Active Brownian Particles. **Poster presentation** at the *Triangle Student Research Competition* (Oct. 2021)
  - Awarded 1st place from over 100 contestants
- Thin Single Crystal Perovskites for Unprecedented Low Noise and Large Linear Dynamic Range Photodetectors. **Poster presentation** at the Consortium for Enabling Technologies and Innovation Workshop (Nov. 2019)
- Development of a Ross Filter-based Aluminum Line Radiation Detector (NickAl2) for MST. **Poster presentation** at the American Physical Society Division of Plasma Physics Annual Meeting (Nov. 2018)
- ROSS Filter Development for Absolute Measurement of Al Line Radiation in MST. **Poster presentation** at the American Physical Society Division of Plasma Physics Annual Meeting (Oct. 2017)

## Awards