# MANISH SHANKLA

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## EXPERIENCE

**Alek Aksimentiev Lab PhD Research Assistant** Sep. 2014 - Dec. 2019

- Developed a $>10^5$ times more efficient DNA sequencing delivery system. (Nature Nano. Cover Sep. 2019)
- Wrote CPU-parallelized stochastic/Monte-Carlo simulations to model DNA transport.
- Crafted data pipelines on HPC supercomputers to simulate hundreds of physics simulations, extract data, and perform down-stream analysis using statistical and machine learning methods.
- Developed image denoising and feature identification pipeline to identify DNA molecules.
- Authored 7 publications, including 2 first-author in Nature sub-journals, with over 165 citations.
- Acquired $350,000 of CPU/GPU hours on XSEDE/Bluewater supercomputers.
- Organized remote collaborations with research groups over 2 years resulting in 2 successful publications.

**Dept. of Physics Teaching Assistant** Sep. 2014 - Dec. 2019

- Lead class sizes of $\sim$30 students in Electronic Circuits, Classical Physics and Electromagnetism courses.

## SKILLS

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|---|---|
| **Programming Languages** | Python, Bash, R, (C++ in coursework) |
| **Machine Learning Frameworks** | PyTorch, scikit-learn, XGBoost, OpenCV |
| **Workflow** | Linux, HPC clusters, MPI4PY, SLURM, TORQUE, Git, SVN, Apache Spark |

## SELECT PROJECTS

**Football Winner Prediction using Ensemble NN and GBT's** Feb. 2020

An ensemble model of gradient boosted trees and neural network predicting football game winners.

**Image-to-Image translation varying generator architectures and loss functions** Dec. 2019

- CycleGAN extension with a Wasserstein (WGAN) loss term and varying generator architecture.

**Evolutionary CycleGAN** May 2019

- An evolutionary algorithm selects optimal generator loss functions during training.

**Biomolecule Delivery on 2D Materials** June 2019

- Efficient delivery method DNA/Proteins using fluid flows and graphene nanostructures.

**Molecular gymnastics of DNA through Graphene pores** January 2015

- Efficient delivery of DNA/Proteins using fluid flows and graphene nanostructures.

## EDUCATION

**University of Illinois at Urbana-Champaign** *Sep. 2014 - Dec. 2019*

PhD Computational Biophysics

Select Coursework: Machine Learning, Deep Learning, Computer Vision, Applied Regression, Data Science

**University of Illinois at Urbana-Champaign** BS Physics *Sep. 2007 - May 2012*

BS Physics Computer Science minor

## AWARDS/LEADERSHIP

**Biophysics Symposium Best Talk** Nov. 2019

- Awarded best symposium out of 20 speakers.

**Oxford Nanopore Technologies Travel Fellowship** June 2018

- Invited talk at the Bremen Nanopore conference.

**Community Outreach** Dec. 2019

- Designed and taught interactive science lessons at a bilingual elementary school. (2014-2019).
- Co-wrote and taught computational modeling tutorials at Summer School workshops (2014-2019).

**Biophysics Conference organizer** Fall. 2017

- Coordinated and chaired an academic conference with participants from several universities.