

Manish Shankla

PERSONAL

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EDUCATION

PhD Biophysics University of Illinois at Urbana-Champaign

2014 – 2019

- Utilized physical models and time domain molecular dynamics simulations on HPC machines to develop a novel biomolecule delivery technique increases DNA capture throughput by $> 10^5$ orders-of-magnitude compared to current commercial nanopore sequencing devices. (The featured publication in the September 2019 issue of Nature Nanotechnology)
- Validated biomolecule delivery technique using physics theory combined with stochastic simulations.
- Collaborated with two remote experimental research groups by setting up weekly meetings to develop theory and improve prediction of biological mutations for increased desalination biological membranes.
- Personally acquired \$350,000 worth of computer CPU/GPU hours on Bluewaters/XSEDE supercomputers through co-written proposals.
- Taught students practical analogue and digital circuits such building lock-in amplifiers or AM/FM de/modulators from scratch (Electronic Circuits, PHYS404), classical physics experiments such as determining the charge of an electron (Classical Physics, PHYS401), and foundational electromagnetism (PHYS212)

BS Physics University of Illinois at Urbana-Champaign
Minor: Computer Science

2012

LEADERSHIP

- Designed interactive science lessons –eg. light waves, color pigmentation, cellular structure–and taught several times per semester at a local bilingual elementary school class. (2014 - Present)
- Organizer of the Fall 2017 Center for the Physics of Living Cells/Biophysics Graduate Student and Postdoc Symposium which included participants from several universities.
- Developed, co-wrote, and taught computational modeling of DNA flexibility (2019), creation of DNA origami (2018), and modeling DNA transport through membranes (2017/6) tutorials for the Center for the Physics of Living Cells Summer School Workshops.
- Mentor newer outdoor rock climbing groups on anchor building, traditional climbing gear placement, and technique.

TECHNICAL SKILLS

- Programming: Python, R, Bash, Tcl/Tk, GIT, SVN
- Deep Learning Framework: Pytorch
- Simulation software: NAMD
- Analog and Digital Electronics
- Select PhD coursework: Machine Learning (STAT 542), Deep Learning (CS 547), Computer Vision (CS 549), Smart Contracts (ECE 398), Applied Regression (STAT 425)

SELECT JOURNAL ARTICLES (3 OUT OF 6)

3. **Shankla M**, and Aleksei Aksimentiev. *Step-defect guided delivery of DNA to a graphene nanopore*. **Nature Nanotechnology** (2019) **Featured on Cover**.
2. Ratul Chowdhury, Tingwei Ren, **Shankla M**, et. al. *PoreDesigner for tuning solute selectivity in a robust and highly permeable outer membrane pore*. **Nature Communications**, 9:3661 (2018).
1. **Shankla M** and Aksimentiev A. *Conformational transitions and stop-and-go nanopore transport of single-stranded DNA on charged graphene* **Nature Communications** 5:5171 (2015).

SELECT TALKS (3 OUT OF 8)

- “DNA delivery on the edge of graphene”. Center for the Physics of Living Cells/Biophysics Graduate Student and Postdoc Symposium Nov. 2018 **Awarded Best Talk**

- “Conformational Transitions and Stop-and-Go Nanopore Transport of Single-Stranded DNA on Charged Graphene”. Conference of the International Physics of Living Systems iPoLS Arlington, Virginia. July 17 2015
- “Uncovering the microscopic mechanism of strand exchange during RecA mediated homologous recombination using all-atom molecular dynamics simulations” American Physical Society (APS) March Meeting, Boston, Mass March 2012.