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Education

- **Graduate Student**, University of Chicago (Chicago, IL) *Expected Aug 2023*
- **Ph.D in Physics**, University of Illinois at Urbana-Champaign (Champaign, IL) *Expected Aug 2023*
  - Center for Physics of Living Cells Fellow (*2018 - 2020*)
- **B.S in Physics**, Hong Kong Baptist University (Hong Kong) *Sep 2014 – July 2018*
  - Hong Kong Special Administrative Region Government Scholarship (*2015 - 2018*)
  - Scholastic Award (*2018*)

Experience

- **Seppe Kuehn lab (University of Chicago / UIUC)**, Research Assistant (IL) *July 2019 - Aug 2023*
  - Led and collaborated in 4 research projects to study the fundamental principles behind microbial communities, combining experimental design, data-driven research and theoretical modeling. Will result in four publications and multiple conference presentations.
  - Designed experiments and conducted whole-genome sequencing on soil isolated microbes.
  - Used machine learning to achieve state-of-the-art prediction of microbial carbon utilization.
  - Built bioinformatic pipelines for large multi-omics datasets in high-speed computing clusters.
  - Scrapped and cleaned datasets from online databases to statistically model microbial metabolism.
  - Created mathematical models of biological buffers and microbial respiration/photosynthesis.
  - Constructed and troubleshooted microcontroller-based experimental devices.
- **Upward Farms**, Microbial Research Associate (Brooklyn, NY) *May 2022 - Aug 2022*
  - Led an innovative research to improve hydroponic crop yields by manipulating plant microbiome.
  - Used statistical modeling and 16S sequencing to identified plant growth-promoting bacteria.
  - Built and unit-tested two software prototypes in AWS: a Snakemake pipeline to streamline NGS sequencing data analysis and a web-based R&D experiment management portal.
  - Conducted experiments in nanopore sequencing, crop phenotyping, and sample collection.
  - Collaborated closely with the R&D team using Git and project management tools.
- **The Abdus Salam International Centre for Theoretical Physics** *Mar 2018*
  Spring College on the Physics of Complex Systems (Trieste, Italy)
  - Completed graduate-level courses in reinforcement learning, statistical physics, and biophysics.
- **Hong Kong Baptist University**, Research Assistant (Hong Kong) *July 2015 - June 2018*
  - Built innovative machine learning models inspired by neuroscience and statistical physics.
  - Conducted multiple data-driven research projects across various biological systems.
  - Taught discussion sessions of two college introductory physics courses.

Skills

- **Data science:** Machine learning, applied statistics, data collection and cleaning, web scrapping, data visualization, remote computing, reinforcement learning, deep learning.
- **Bioinformatics:** Snakemake, 16S, metagenomics, transcriptomics, single-cell amplified genome, long-read sequencing, databases (KEGG, NCBI, UniProt, Pfam, BioCyc).
- **Experimental microbiology:** Experimental design, web lab, next-generation sequencing, nanopore sequencing, DNA extraction, common assays, microcontrollers (Arduino, Raspberry Pi), electronics.
- **Computational biology and physics:** Computational neuroscience, signal analysis, image analysis, dynamical systems, numerical simulation, statistical physics.
- **Software:** Python (Numpy, Pandas, Scikit-Learn, Seaborn, Matplotlib, Dash/Plotly, Jupyter), MongoDB, R, Git, unit-testing, Linux, Bash, Java, JavaScript, LaTeX, project management.