

Nikša Praljak

Ph.D. Candidate in Biophysics at the University of Chicago

+1 (440) 532 3157

in npraljak

PraljakReps

✉ niksapraljak1@uchicago.edu

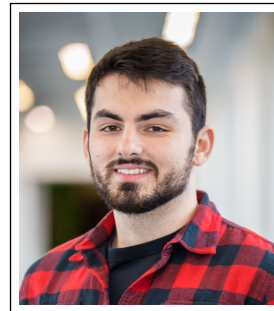
✉ niksapraljak1@gmail.com

🌐 Personal Website

🎓 Google Scholar Profile

🏛️ University of Chicago Website

🌐 X (formerly Twitter)



Note: Words highlighted in blue are clickable links.

Education

University of Chicago

Autumn 2020 - Present

Chicago, Illinois

PhD Student: Biophysical Sciences Graduate Program (NSF Graduate Research Fellow)

Thesis: Molecular Dialogues: Guiding Protein Design through Natural Language Prompts

PhD co-advisors: Professors [Rama Ranganathan](#) and [Andrew Ferguson](#)

Case Western Reserve University

Autumn 2018 - Summer 2020

Cleveland, Ohio

Department of Physics: Visiting Student and Researcher

GPA: 4.0

Research: Integrating computer vision with protein adhesion-based microfluidic assays for sickle cell patient diagnostics

Advisors: Drs. Michael Hinczewski (Theoretical Biophysics Research Group) and Umut Gurkan (CASE Biomanufacturing and Microfabrication Laboratory)

Cleveland State University

Autumn 2016 - Spring 2020

Cleveland, Ohio

Undergraduate Majors: Honors Mathematics and Honors Physics

Summa Cum Laude ([COSHP Valedictorian](#))

Undergraduate Honors Thesis: Pulsatile Flow Through Idealized Renal Tubules

Publications

These are selected publications. For a complete list, please see my [Google Scholar profile](#).

1. X Lian*, **N Praljak***, SK Subramanian*, S Wasinger, R Ranganathan, ... (2024). Deep-learning-based design of synthetic orthologs of SH3 signaling domains. *Cell Systems*, 15(8), 725-737.
- Featured in: [Fu X. How deep can we decipher protein evolution with deep learning models. Patterns, Volume 5, Issue 8, 9 August 2024, 101043. This preview highlights our work on applying deep learning to protein evolution and design.](#)
2. **N Praljak***, X Lian, R Ranganathan, AL Ferguson. (2023). ProtWave-VAE: Integrating autoregressive sampling with latent-based inference for data-driven protein design. *ACS Synthetic Biology*, 12(12), 3544-3561.
- Featured in: [García Martín H, Mazurenko S, Zhao H. Special Issue on Artificial Intelligence for Synthetic Biology. ACS Synth. Biol. 2024, 13, 2, 408-410. This special issue highlights and features our work on integrating AI with synthetic biology.](#)
3. **N Praljak***, S Iram*, U Goreke, G Singh, A Hill, UA Gurkan, M Hinczewski. (2021). Integrating deep learning with microfluidics for biophysical classification of sickle red blood cells adhered to laminin. *PLOS Computational Biology*, 17(11), e1008946.

* Denotes co-first authors

Patents

These are selected patents. For a complete list, please see my [Google Scholar profile](#).

1. **Techniques for Artificial Intelligence (AI) Based Protein Engineering Using Natural Language Prompting**
Attorney Docket Number: 27373/70285P
Inventors: Andrew L. Ferguson, **Niksa Praljak**, and Rama Ranganathan
Status: Patent Application Submitted.
2. **Classification of Blood Cells**
U.S. Patent Application No.: 17/928,976
Inventors: **Niksa Praljak**, Iram Shamreen, Utku Goreke, Michael Hinczewski, HILL Ailis, Umut Gurkan, Gundeep Singh
3. **System, Method, and Computer Readable Storage Medium for Auto-Regressive Wavenet Variational Autoencoders for Alignment-Free Generative Protein Design and Fitness Prediction**
U.S. Provisional Patent Application No.: 63/314,898
Inventors: **Niksa Praljak**, Andrew L. Ferguson

██████ Talks & Presentations

1. **Praljak N.**, "A multimodal generative model with natural language for protein design" Oral presentation at the Multimodal AI Workshop, Toyota Tech Institute at Chicago (TTIC), January 2024.
- [Workshop Link](#)
2. **Praljak N.**, "Autoregressive WaveNet Variational Autoencoders for Alignment-free Generative Protein Design and Fitness Prediction" Poster presentation delivered at the ICLR Machine for Drug Discovery workshop, virtual, April 29th, 2022.
3. **Praljak N.**, "Data-driven protein design" Oral presentation delivered at the Grier Prize Symposium, University of Chicago, December 7th, 2021.
- Fortunate enough to present to over 200 attendees.

██████ Honors & Awards

- 2023 University of Chicago Data Science Institute (DSI), AI+Science Research Initiative Grant Award
- Award amount of \$10k to initiate a new project at the interface of AI and Science.
- Launched research project: "[Discovering the Design Rules Linking Protein Sequence to Function](#)".
- 2021 Finalist for the Grier Prize for Innovative Research in Biophysics
- 2021 The University of Chicago Duchossois Family Institute Fellow
- 2020 [National Science Foundation \(NSF\) Graduate Research Fellowship](#)
- 2020 [College of Science and Health Professions \(COSHP\) Valedictorian](#)
- 2019 OSAPS Research Travel Award
- 2019 CSU College of Graduate Studies Research Travel Award
- 2019 Undergraduate Physics Poster Award, 2019 COSHP Research Day
- 2018 Soft Matter REU Travel Award
- 2018 Mandel Honors Scholarship
- 2017 Ann M. Frangos Mathematics Award (first-ever CSU recipient)
- 2017 Jearl Walker Physics Scholarship

██████ Technical Skills

Programming	Python, C++, R, Jekyll, MATLAB
ML Software	PyTorch, DeepSpeed, HuggingFace, Jax, TensorFlow, Scikit-learn
ML Methods	Autoregressive models (LLMs), VAEs, Diffusion models, Self-Supervised Learning, Bayesian Optimiziation
Data Science	NumPy, Pandas, Matplotlib, Seaborn, SciPy, Dask, TensorBoard, HDF5
Bioinformatics	Biopython, BLAST, Clustal, HMMER, Bowtie, Samtools, MUSCLE, Trimmomatic, FastQC, TrimAI
Tools	Git, Linux, HPC Environments, PBS, SLURM, bash