

# Michael Chungyoun

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## EDUCATION:

**Johns Hopkins University, Baltimore, MD**

Sep 2021 – (Expected end) Jun 2025

- Doctor of Philosophy – **Chemical & Biomolecular Engineering**
- Master of Science in Engineering – **Applied Mathematics & Statistics**

**University of Washington, Seattle, WA**

Sep 2016 – Jun 2021

- Bachelor of Science – **Chemical Engineering** | 5x Dean's List Award

## FELLOWSHIPS:

**NSF Graduate Research Fellowship Program (GRFP)**

Awarded March 2023

**Graduate Education for Minorities (GEM) Fellowship**

Awarded Dec 2021

## COMPUTATIONAL SKILLS:

**Python** (PyTorch, NumPy, Pandas, JAX, Scikit-learn, TensorFlow, Keras) | **C++** (Rosetta3) | **R** (Tidyverse, RShiny, Plotly) | **SQL** |

- Experienced applying machine learning, data science, object-oriented programming, **git** for version control, shell scripting, and data visualization in industrial and academic projects

## INTERNSHIP EXPERIENCE:

**Deep Learning Intern, Genentech, New York, NY, Prof. Richard Bonneau**

May 2022 – Oct 2022

- Developed a method for distribution-free uncertainty quantification using conformal prediction, generalizable to both structure-based and sequence-based protein design methods as part of the Prescient Design team
- Contributed to fine-tuning BERT language model for producing enriched representations of T-cell receptor (TCR) proteins for application in TCR structure prediction pipeline

**Digital & Data Science Intern, Genentech, San Francisco CA, Dr. Victor Saucedo**

Jun 2021 – Sep 2021

- Automated liquid chromatography data analysis for real-time release testing of therapeutic large molecules
- Created Python functions that interpret chromatograms and push or retrieve data from team repository

**Computational Biology Intern, Adaptive Biotechnologies, Seattle WA, Dr. Paul Fields**

Nov 2020 – Jun 2021

- Trained in next generation sequencing under supervision of principal scientist and spearheaded weekly literature reviews on novel discoveries in ssDNA nanostructures for drug delivery and PD-1 blocking antibody development

**Medical Diagnostics Intern, Novo Nordisk, Seattle WA, Prof. Per Reinhall**

Oct 2020 – Jun 2021

- Developed 3-sensor (optical, electrical, and ultrasound) noninvasive blood pressure monitor that incorporates decision tree machine learning in collaboration with 2 research scientists from Novo Nordisk and an electrical engineering PhD candidate
- Awarded \$7,250 through case competitions, 3<sup>rd</sup> place out of 21 invited startups at UW entrepreneurship pitch competition

## RESEARCH EXPERIENCE:

**Doctoral Computational Researcher, Johns Hopkins University, Baltimore MD, Prof. Jeffrey Gray**

Sep 2021 – Present

- Developing an antigen-specific, diffusion-based generative model for antibody design using an augmented dataset of >1M therapeutically relevant antibody-antigen complexes

**Undergraduate Drug Delivery Researcher, UW Chemical Engineering, Seattle WA, Prof. Elizabeth Nance**

Jun 2019 – Jun 2021

- Determined sonication parameters necessary to improve therapeutic enzyme activity of double emulsion polymeric nanoparticles from 20% to 50% for use in blood brain barrier drug delivery

**Undergraduate Pharmacology Researcher, UW Pharmacology, Seattle WA, Prof. Chris Hague**

Mar 2018 – Jun 2019

- Identified possible amino acid sites of a N-glycosylation cleaving event in alpha1-D G protein-coupled receptors

## PUBLICATIONS & PATENTS:

- **Chungyoun M.**, Ruffolo J, Gray J. FLAb: Benchmarking deep learning methods for antibody fitness prediction. *Conference on Neural Information Processing Systems*. (2023). (Pending)
- **Chungyoun M.**, Gray J. AI Models for Protein Design are Driving Antibody Engineering. *Current Opinion in Biomedical Engineering*. (2023). <https://doi.org/10.1016/j.cobme.2023.100473>
- (Genentech authors anonymous while pending), **Chungyoun M.**, inventors; Genentech Global Patent Operations Team, assignee. *Hybrid protein design*. United State patent application, submitted 2022 July 7.
- Wang N., Tonko P., Ragav N., **Chungyoun M.** et al. A perspective on K-12 AI education. *National Academy of Inventors - Technology & Innovation*. (2022). <https://arxiv.org/abs/2206.03217>
- Mckenna M., Fliteau J., Sluis K., **Chungyoun M.** et al. Organotypic whole hemisphere brain slice models to study the effects of donor age and oxygen-glucose-deprivation on the extracellular properties of cortical and striatal tissue. *Journal of Biological Engineering*, 16, 14 (2021). <https://doi.org/10.1186/s13036-022-00293-w>
- **Chungyoun M.**, Shin A., Peng H., Shahukar S., inventors ; CoMotion at the University of Washington, assignee. *Three-sensor Unobtrusive Blood Pressure Monitoring Device*. United States provisional patent 63/193,509. 2021 May 26.
- Liao, R., Pon, J., **Chungyoun, M.** et al. Enzymatic protection and biocompatibility screening of enzyme-loaded polymeric nanoparticles for neurotherapeutic applications. *Biomaterials*, 120238 (2020). <https://doi.org/10.1016/j.biomaterials.2020.120238>
- Janezic, E.M., Lauer, S.M., Williams, R.G. **Chungyoun, M.** et al. N-glycosylation of  $\alpha$ 1D-adrenergic receptor N-terminal domain is required for correct trafficking, function, and biogenesis. *Scientific Reports* 10, 7209 (2020). <https://doi.org/10.1038/s41598-020-64102-4>