Michael Chungyoun

425 236 2902 | mchungy1@jhu.edu | https://www.linkedin.com/in/mfc12/

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

COMPUTATIONAL SKILLS:

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

- Experienced applying data science, object-oriented programming, **git** for version control, machine learning, and data visualization in industrial and academic projects
- Incorporating cloud computing, multithreading, bash scripting, and attention-based learning in protein prediction models
- Beginner experience with **HTML5**, **CSS3**, and **JavaScript** for web development

RESEARCH EXPERIENCE:

Doctoral Computational Researcher*, **Johns Hopkins University**, Baltimore MD, Prof. Jeffrey Gray* Sep 2021 – Present

- Developing computational tools with machine learning, natural language processing, and Rosetta software to predict the structure of antibodies, antibody-antigen complexes, and protein-protein 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
- Awarded $10,000 in funding, authored on **Biomaterials** journal publication, and presented at 4 national conferences

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
- Authored on **Scientific Reports** journal publication, presented independent research project at 1 national conference

COMPUTATIONAL INTERNSHIP EXPERIENCE:

Deep Learning Intern, *Genentech, New York, NY, Prof. Richard Bonneau* May 2022 – Sep 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, 3rd place out of 21 invited startups at UW entrepreneurship pitch competition

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.

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- Wang N., Tonko P., Ragav N., **Chungyoun M.** et al. A perspective on K-12 AI education. *National Academy of Inventors*. (2022, pending). 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 serial number 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 α1D-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

PRESENTATION EXPERIENCE:

Chungyoun, M., Ruffolo J., Gray J. (2023, September). *FLAb: Benchmarking deep learning methods for antibody fitness prediction*. Oral presentation to be delivered at European RosettaCON 2023, Leipzig, Germany.

Chungyoun, M., Andrade F., Gray J. (2022, July). *Elucidating the cross-reactive nature of anti-citrullinated antibodies with FlexPepDock*. Poster session presented at Summer RosettaCON 2022, Leavenworth, WA.

Chungyoun, M., Liao, R., Nance, E. (2021, May) *Optimizing the Polymeric Nanoparticle Formulation Parameters and Characterizing Poly(ethylene glycol) Degradation for Neurological Drug Delivery*. Poster session presented at The 24th University of Washington Undergraduate Research Symposium, Seattle, WA.

Chungyoun, M., Shahukar, S., Shin, A., Peng, H. (2021, March) *Under Pressure: Unobtrusive Blood Pressure Monitoring in the Operating Room*. ePoster session presented at The Hollomon Health Innovation Challenge, hosted by Arthur W. Buerk Center for Entrepreneurship, Seattle, WA.

Chungyoun, M., Shahukar, S., Shin, A., Peng, H. (2021, January) *Under Pressure: Unobtrusive Blood Pressure Monitoring in the Operating Room*. ePoster session presented at The Science & Technology Showcase, hosted by The Science and Engineering Business Association (SEBA), Seattle, WA.

Chungyoun, M., Liao, R., Nance, E. (2020, November) *Optimizing the Polymeric Nanoparticle Formulation Parameters and Characterizing Poly(ethylene glycol) Degradation for Neurological Drug Delivery*. ePoster session presented at The Annual Biomedical Research Conference for Minority Students (ABRCMS) Virtual Conference.

Chungyoun, M., Liao, R., Nance, E. (2020, October) *Optimizing the Polymeric Nanoparticle Formulation Parameters and Characterizing Poly(ethylene glycol) Degradation for Neurological Drug Delivery*. ePoster session presented at The Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Virtual Conference.

Chungyoun, M., Liao, R., Nance, E. (2020, May) *Maximizing Enzyme Loading and Characterizing Polymer Degradation in Therapeutic Nanoparticles*. Poster session presented at the 23rd University of Washington Undergraduate Research Symposium, Seattle, WA.

Chungyoun, M., Janezic, E., Soon-Lee, K., Harris, D.A., & Williams, G. (2019, May) *Determining How N-terminal Domains Regulate the GPCRs CysLT2, MAS1, and NPFFR2*. Poster session presented at The 22nd University of Washington Undergraduate Research Symposium, Seattle, WA.

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FELLOWSHIPS: Total monetary value over $60,000

National Science Foundation (NSF) Graduate Research Fellowship Program	**Mar 2023**
Graduate Education for Minorities Fellowship *Elite national award covering cost of entire PhD program*	**Dec 2021**
Husky 100 *Selected as 1 of UW's 100 most driven and impactful students*	**Mar 2021**
Johns Hopkins Dean's Scholar Award *for academic merit in first year at Johns Hopkins*	**Mar 2021**
3rd Place, Hollomon Health Innovation Challenge *Awarded out of 21 student-startups and projects*	**Mar 2021**
Mary Gates Research Scholarship *Funding for undergraduate research*	**Dec 2020**
Genentech Outstanding Student Award *Scholarship and guaranteed internship position*	**Dec 2020**
American Chemical Society Bridge Travel Award *Awarded to cover cost of 3 national conferences*	**Aug 2020**
National Science Foundation (NSF) *Stipend funding for conducting work at Membrion*	**Aug 2020**
SACNAS National Diversity in STEM Conference Travel Award *Cover cost of 2020 conference*	**Aug 2020**
2-time Chemical Engineering Departmental Scholarship *Funding for academic merit*	**Aug 2020**
Engineering Peer Educator Scholarship *Awarded for service as a mentor to engineering freshmen*	**Jun 2020**
Ronald E. McNair Scholarship *Funding and mentoring for minority students to support PhD pursuits*	**Feb 2020**