

Beau J. Lonnquist

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Education

Ph.D. in Biophysics, University of California, San Francisco

2025–Present

B.S. in Bioengineering, University of Washington, Seattle

2021–2025

Graduated with Departmental Honors and Data Science Option

GPA: 3.98/4.00 (Summa Cum Laude)

Thesis Title: *Computational Design of de novo Transcription Factors for Targeted Genetic Repression*

Thesis Advisors: Prof. David Baker & Prof. Cameron Glasscock (Rice University)

Research & Industry Experience

Baker Lab, Institute for Protein Design, University of Washington

Seattle, WA

Washington Research Foundation / Levinson Fellow

Aug. 2023–June 2025

- Designed de novo DNA-bending repressors to investigate the role of DNA bending in bacterial transcription
- Developed matrix-based Python scripts to facilitate homo-oligomer design and generate bent DNA structures
- Optimized LigandMPNN by encoding explicit hydrogen bonds to improve designed protein-ligand interactions

Summer Research Program Fellow

June 2023–Aug. 2023

- Designed de novo repression-inducing transcription factors using RFdiffusion, ProteinMPNN, and AlphaFold2
- Applied PyMOL and PyRosetta scripting to compute multiple variations of RMSD to score designed proteins
- Performed PCR, Golden Gate assembly, and flow cytometry to measure fold-repression of designs in *E. coli*

Multi-Quarter Research Program Fellow

Sept. 2022–June 2023

- Employed machine learning and physics-based methods to design sequence-specific DNA-binding proteins
- Wrote Python and Bash scripts to manipulate molecular structures, calculate metrics, and perform data analysis
- Characterized DNA-binding proteins with yeast display and FACS to assess binding specificity and affinity

Genentech—A Member of the Roche Group

Hillsboro, OR

Cell Therapy Process Engineering Intern

June 2024–Sept. 2024

- Automated stem cell therapy processes with VBA to streamline manufacturing and meet cGMP requirements
- Configured alarms to support bioreactor-driven cell expansion, monitor processes, and minimize product loss
- Conducted exploratory stem cell expansion and differentiation studies to optimize the manufacturing process

Computer-Aided Drug Discovery (Internship Side-Project)

June 2024–Sept. 2024

- Screened millions of cancer drug leads using Schrödinger Glide and OpenEye HYBRID docking software
- Prepared high-quality protein and ligand structures for screening using Python, Bash and Schrödinger Maestro
- Applied foundational medicinal chemistry principles to identify unusual intermolecular interactions playing essential roles in protein-ligand binding

HuskyADAPT, Department of Mechanical Engineering, University of Washington**Seattle, WA***Research & Development Engineer**Sept. 2021–June 2022*

- Designed a device that enabled individuals with impaired motor functions to autonomously play card games
- Engineered modular 3D-printed and laser-cut components and optimized through iterative design
- Assessed the structural and electrical reliability of 3 different prototypes through rigorous and diverse testing

Teaching & Mentorship Experience

Students Tutor Students**Virtual***Volunteer Mathematics Tutor**Mar. 2020–Present*

- Provide weekly individualized tutoring for 2 students, ages 9 and 13, to support learning and content retention
- Create specialized worksheets and lessons catered to each child's learning style to improve understanding
- Maintain an encouraging and patient demeanor to boost child confidence and overcome challenging topics

Department of Bioengineering, University of Washington**Seattle, WA***Teaching Assistant, Biochemical & Molecular Engineering**Mar. 2024–June 2025*

- Supported 100 students through office hours, review sessions, and answering questions on Canvas and Piazza
- Developed curricula and led lectures on molecular analysis and visualization using PyMOL and Chimera
- Graded assignments and exams to assess student learning and inform potential teaching adjustments

Baker Lab, Institute for Protein Design, University of Washington**Seattle, WA***Multi-Quarter Research Program Mentor**Sept. 2023–June 2025*

- Mentored over 20 undergraduates across two cohorts in designing de novo DNA-binding and switch proteins
- Developed student computational and experimental skills in group meetings, office hours, and wet lab sessions
- Designed template code to assist students in learning the fundamentals of programming for protein design

College of Engineering, University of Washington**Seattle, WA***Engineering Peer Educator**Mar. 2022–Mar. 2024*

- Instructed two 11-week classes of 25 first-year engineering students in foundational skills for higher education
- Crafted and executed engaging lesson plans on academic success, engineering skills, and career planning
- Communicated with administrators to provide accurate and timely support to address unique student needs

University of Washington / Chehalis Foundation Summer STEM Camp**Chehalis, WA***Science & Engineering Camp Instructor**Aug. 2023*

- Collaborated with Ph.D. and postdoc scholars to create protein design curricula for 70 high school students
- Presented high-level machine learning and protein energetics keynotes to introduce core design principles
- Led Google Colab simulations and a tangible protein design activity to emphasize key biochemistry concepts

Leadership & Community Outreach Experience

Biomedical Engineering Society, University of Washington**Seattle, WA***Mentorship Chair**June 2024–June 2025*

- Facilitated a program connecting over 100 mentees with mentors to provide academic and career mentorship
- Organized quarterly events to provide students networking, mentorship, and career exploration opportunities
- Supported outreach efforts on campus and in local communities to promote BioE to college and K-12 students

Husky Triathlon Club, University of Washington

Seattle, WA

Club Officer

June 2022–June 2024

- Managed club data and information for over 30 athletes to keep team records and insurance up to date
- Created and maintained a team website to serve as a centralized location for team info and accomplishments
- Assisted in organizing and executing an indoor triathlon for over 75 participants and fundraising over \$2500

Triangle STEM Fraternity, University of Washington

Seattle, WA

Vice President

Feb. 2022–Feb. 2024

- Led a fraternity of over 30 students, managing internal affairs and ensuring compliance with national standards
- Coordinated 8 recruitment events and 20 interviews that increased the chapter size by 50% in just 2 weeks
- Represented the chapter in communications with Greek organizations, clubs, and the College of Engineering

Publications

- [1] C. J. Glasscock, R. Pecoraro, R. McHugh, L. A. Doyle, W. Chen, O. Boivin, **B. Lonnquist**, E. Na, Y. Politanska, H. K. Haddox, D. Cox, C. Norn, B. Coventry, I. Goreschnik, D. Vafeados, G. R. Lee, R. Gordon, B. L. Stoddard, F. DiMaio, and D. Baker, “Computational design of sequence-specific DNA-binding proteins,” *bioRxiv*, 2023, [doi:10.1101/2023.09.20.558720](https://doi.org/10.1101/2023.09.20.558720) (Accepted at *Nat. Struct. Mol. Biol.*).

Presentations

- [11] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of *de novo* Transcription Factors for Targeted Genetic Repression,” **Schrödinger’s Molecules & Models Science Fair**, Virtual, 2025 (Keynote).
- [10] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of DNA-Bending Transcription Factors for Enhanced Genetic Control,” **UW Bioengineering Capstone Showcase**, Seattle, WA, 2025 (Poster).
- [9] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of DNA-Bending Transcription Factors for Enhanced Genetic Control,” **UW Annual Undergraduate Research Symposium**, Seattle, WA, 2025 (Poster).
- [8] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Bending the Rules: *de novo* Transcription Factor Design for Targeted Gene Regulation,” **Engineering Biology Research Consortium (EBRC) Annual Meeting**, Seattle, WA, 2025 (Poster).
- [7] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of *de novo* Transcription Factors as Novel Gene Therapies,” **Gulf Coast Undergraduate Research Symposium (GCURS) at Rice University**, Houston, TX, 2024 (Keynote).
- [6] **B. Lonnquist**, A. Gonzalez, and D. Slater, “Streamlining Stem Cell Therapy Manufacturing: Automated Approaches to Bioreactor-driven Stem Cell Expansion,” **Genentech Annual Intern Poster Day**, Hillsboro, OR, 2024 (Poster).

- [5] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Synthetic Transcription Factors and Other Stories in Protein Science,” **Genentech Hillsboro Innovative Therapies Lunch & Learn**, Hillsboro, OR, 2024 (Keynote).
- [4] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of *de novo* DNA-binding Homodimers for Genetic Manipulation,” **The Protein Society’s 38th Annual Symposium**, Vancouver, BC, 2024 (Poster).
- [3] **B. Lonnquist**, C. J. Glasscock, and D. Baker, “Computational Design of *de novo* DNA-binding Homodimers for Genetic Manipulation,” **UW Annual Undergraduate Research Symposium**, Seattle, WA, 2024 (Poster).
- [2] **B. Lonnquist**, C. J. Glasscock, R. Pecoraro, and D. Baker, “Unlocking Genetic Regulation: *de novo* DNA-binding Homodimers,” **UW Summer Research Symposium**, Seattle, WA, 2023 (Poster).
- [1] **B. Lonnquist**, A. Lin, Z. Isley, S. Janakiraman, D. Nguyen, and K. Borgia, “Designing an Accessible Device for Card Games,” **UW Center for Research and Education on Accessible Technology and Experiences (CREATE) Showcase**, Seattle, WA, 2022 (Keynote & Poster).

Honors & Awards

Research Fellowships

NSF Graduate Research Fellowship Program Award National Science Foundation	Apr. 2025
Washington Research Foundation Fellowship UW Office of Undergraduate Research	Sept. 2024
Levinson Emerging Scholars Fellowship UW Office of Undergraduate Research	Sept. 2023
Summer Undergraduate Research Fellowship Institute for Protein Design at the UW	June 2023
Multi-Quarter Undergraduate Research Fellowship Institute for Protein Design at the UW	Aug. 2022

Research Honors & Awards

Presentation Competition Winner Schrödinger’s Molecules & Models Science Fair	June 2025
Research Conference Travel Award (EBRC) UW Office of Undergraduate Research	May 2025
Best Presentation in Biomedical Research GCURS at Rice University	Nov. 2024
Chemical and Biomolecular Engineering Travel Grant GCURS at Rice University	Nov. 2024
Poster Competition Winner The Protein Society’s 38th Annual Symposium	July 2024
Research Conference Travel Award (Protein Society) UW Office of Undergraduate Research	July 2024

Academic Honors & Scholarships

Dean’s Medal for Academic Excellence Finalist UW College of Engineering	Mar. 2025
Hoffman Endowed Scholarship UW Department of Bioengineering	Aug. 2024
Homi Kapadia Scholarship Triangle Education Foundation	June 2024
Emerging Leader in Engineering UW College of Engineering	Sept. 2023
James Rust Scholarship Triangle Education Foundation	July 2023
Stratos-Stephan Endowed Scholarship UW Department of Bioengineering	July 2023
Edward J. Ammer Jr. Endowed Scholarship UW College of Engineering	Sept. 2022
Andy Grove Scholarship Intel Corporation	Apr. 2022
Purple and Gold Scholarship UW College of Engineering	Sept. 2021
Balanced Man Scholarship Semifinalist Sigma Phi Epsilon at UW	Sept. 2021
Cherie Pun Memorial Scholarship Jacob Wismer Elementary School	June 2021

Additional Honors & Awards

Undergraduate Class Graduation Speaker UW Department of Bioengineering	June 2025
Second Place, Jody Deering Nyquist Speech Contest UW Department of Communication	June 2024
Outstanding Engineering Peer Educator of the Year UW College of Engineering	Dec. 2023

Professional Affiliations

Tau Beta Pi Engineering Honor Society	May 2025–Present
Biomedical Engineering Society	Sept. 2022–Present