Beau J. Lonnquist

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Education

Ph.D. in Biophysics, University of California, San Francisco **Sept. 2025–Present**

B.S. in Bioengineering, University of Washington, Seattle **Sept. 2021–June 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. Goreshnik, D. Vafeados, G. R. Lee, R. Gordon, B. L. Stoddard, F. DiMaio, and D. Baker, "Computational design of sequence-specific DNA-binding proteins," *Nat Struct Mol Biol*, pp. 1-10, Sept. 2025, doi:10.1038/s41594-025-01669-4.

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 | 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