Alexander Derry

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SUMMARY

- PhD candidate with expertise in machine learning and AI methods development for biomedical applications
- Extensive experience in end-to-end training of large neural networks, open-source software development, and statistical analysis of biomedical data (e.g. molecular sequence & structure, natural language processing, networks)
- Strong scientific communicator with experience presenting at local and international conferences, writing research papers and explanatory statistics columns in major journals, and professional scientific editing
- Excellent collaborator, leader, and mentor in multi-disciplinary scientific and administrative roles

SCIENTIFIC & TECHNICAL EXPERIENCE

Stanford University, *Stanford CA* 2018–present

PhD Researcher, Biomedical Informatics, PI: Russ B. Altman, M.D., Ph.D.

- Developed several novel AI-based methods that enable more precise and interpretable analysis of protein structure and function for applications in protein design, drug discovery, and biomedicine
- Led and contributed to multiple projects which improve the accessibility and reproducibility of machine learning research in structural biology through benchmarking, dataset curation, and open-source software development
- Performed high-throughput screening and molecular modeling as a consultant for multiple drug discovery projects
- Published 8 manuscripts and articles (5 first-author), presented work at local and international scientific conferences

nference Inc., *Cambridge MA* Jul–Sep 2018

Data Scientist, Intern

- Built and analyzed natural language processing pipelines for extracting complex interactions from unstructured text
- Developed front-end and back-end software which was integrated into the company's web platform

Biogen Inc., *Cambridge, MA* Jun–Aug 2017

Computational Biology Intern

- Developed network-based method for prioritizing drug targets, reducing bias and accelerating biological discovery

Massachusetts Institute of Technology, *Cambridge MA* 2015–2018

Undergraduate Researcher, Dept. of Materials Science and Engineering

- *Alfredo Alexander-Katz Lab:* Modeled nanoparticle interaction with lipid bilayers using molecular dynamics for membrane protein mimetics and drug delivery applications
- *Polina Anikeeva Lab*: Fabricated, characterized, and tested flexible and stretchable polymer neural probes for simultaneous stimulation and recording of spinal cord neuron activity

eWorldEditing Inc., *Remote* 2016–2018

Scientific Editor

- Revised over 100 manuscripts for non-native English speakers to prepare for publication in a range of disciplines

AkzoNobel Decorative Coatings, *Amsterdam, the Netherlands* Jun–Aug 2016

Data Analyst Intern

- Organized and led new integrated data analysis and reporting program for R&D department

EnerG2 Technologies Inc., *Cambridge, MA* Jun–Aug 2015

Research Scientist Intern

- Fabricated and tested novel low-cost composites for improving capacity and cycle stability of lithium-ion batteries

LEADERSHIP, TEACHING, AND MENTORSHIP

Student Representative, Biomedical Informatics Program 2021–2022

- Served on PhD admissions committee, reviewing over 300 applications
- Presented at executive committee meetings, participated in curriculum redesign, organized community and networking events, ran student town halls, represented student interests before department faculty and staff

Teaching Assistant 2019–2023

- Courses: *Representations and Algorithms for Computational Molecular Biology* and *Principles of Pharmacogenomics*
- Designed programming projects, presented lectures, managed logistics, graded assignments, held office hours

Research Mentor 2020–present

- Trained 2 undergraduates in data science skills, project design, and career guidance through the *Inclusive Mentorship in Data Science* & *Amgen Scholars* Programs, as well as 4 graduate rotation students in the Altman lab

EDUCATION

Stanford University, *Stanford CA* 2018–2023 (expected)
PhD, Biomedical Informatics; Advisor: Russ B. Altman, M.D., Ph.D.; GPA: 3.96/4.00

Massachusetts Institute of Technology, *Cambridge MA* 2014–2018
Bachelor of Science, Materials Science and Engineering; Minor, Business Analytics; GPA: 4.9/5.0

SKILLS

AI & ML: building and evaluating end-to-end distributed training and inference pipelines in Pytorch and Pytorch-Lightning, including convolutional, graph, and transformer neural network and development of new architectures

Programming & software development: package development in Python and R, cluster computing, version control

Molecular modeling: high-throughput screening, protein-ligand docking, homology modeling, visualization in Pymol

Communication: designing talks/lectures, writing and speaking for various audiences, proficient in Adobe Illustrator

PUBLICATIONS

1. **Derry, A.** & Altman, R.B. (2022). COLLAPSE: A representation learning framework for identification and characterization of protein structural sites. *Protein Science*. e4541.
2. **Derry, A.***, Carpenter, K.*, & Altman, R. B. (2021). Training data composition affects performance of structure analysis algorithms. In *PACIFIC SYMPOSIUM ON BIOCOMPUTING 2022* (pp. 10-22).
    - Selected for oral presentation at Pacific Symposium on Biocomputing, Jan. 2022, Hawaii.
3. Townshend, R. J. L., Vogele, M.*, Suriana, P.*, **Derry, A.***, Powers, A., Laloudakis, Y., Balachandar, S., Jing, B., Anderson, B., Eismann, S., Kondor, R., Altman, R. B., & Dror, R. O. (2021). ATOM3D: Tasks On Molecules in Three Dimensions. *NeurIPS 2021 Datasets and Benchmarks Track*.
    - Selected for oral presentation at NeurIPS Learning Meaningful Representations of Life workshop, Dec. 11, 2020.
    - Best paper award at NeurIPS Datasets and Benchmarks Track, Dec. 2021.
4. **Derry, A.**, Krzywinski, M., & Altman, N. (2023) Points of Significance: Neural networks primer. *Nature Methods,* 20*.*
5. Sosa, D. N.*, **Derry, A.***, Guo, M.*, Wei, E., Brinton, C., & Altman, R. B. (2019). A literature-based knowledge graph embedding method for identifying drug repurposing opportunities in rare diseases. In *PACIFIC SYMPOSIUM ON BIOCOMPUTING 2020* (pp. 463-474).
    - Selected for oral presentation at Pacific Symposium on Biocomputing, Jan. 2020, Hawaii.
6. Anand-Achim, N., Eguchi, R. R., Mathews I. I., Perez C. P., **Derry, A.**, Altman, R. B., & Huang, P.-S. (2022). Protein Sequence Design with a Learned Potential. *Nature Communications,* 13.
7. Rensi, S., Keys, A., Lo, Y.-C., **Derry, A**., McInnes, G., Liu, T., & Altman R. B. (2020). Homology Modeling of TMPRSS2 Yields Candidate Drugs That May Inhibit Entry of SARS-CoV-2 into Human Cells. *ChemRxiv*.
8. Lu, C., Park, S., Richner, T. J., **Derry, A.**, Brown, I., Hou, C., Rao, S., Kang, J., Moritz, C. T., Fink, Y., & Anikeeva, P. (2017). Flexible and stretchable nanowire-coated fibers for optoelectronic probing of spinal cord circuits. *Science Advances*, 3(3).