Alexander Derry

PhD Candidate, Biomedical Informatics
Stanford University
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EDUCATION

Stanford University, *Stanford CA* 2018-present
Ph.D. Candidate, Biomedical Informatics
Advisor: Russ B. Altman, M.D., Ph.D.

Massachusetts Institute of Technology, *Cambridge MA* 2014–2018
Bachelor of Science, Materials Science and Engineering
Minor, Business Analytics
Unweighted GPA: 4.9/5.0
Thesis: *Interaction of amphiphilic nanoparticles with structurally perturbed lipid membranes*

RESEARCH EXPERIENCE

Graduate Student, Stanford University 2018-present
Biomedical Informatics Training Program
PI: Russ B. Altman, M.D., Ph.D.

- Development and analysis of deep learning algorithms for representing 3D protein structures, including multi-task, learning, and transfer learning methods, with focus on applications in mutation analysis, drug discovery, and pharmacogenetics
- Benchmarking, dataset creation, robustness analysis, and development of open source software for machine learning in structural biology
- Additional research in drug-protein interaction modeling, protein design, and drug repurposing

Undergraduate Researcher, Massachusetts Institute of Technology 2017-2018
Department of Materials Science and Engineering
PI: Alfredo Alexander-Katz, Ph.D.

- Modeled interaction of amphiphilic nanoparticles with lipid bilayers using molecular dynamics
- Showed that lipid area asymmetry and lateral tension enhance nanoparticle uptake in both leaflets and affect the permeability properties of the membrane with respect to small molecules

Undergraduate Researcher, Massachusetts Institute of Technology 2015-2016
MIT Research Laboratory for Electronics
PI: Polina Anikeeva, Ph.D.

- Fabricated, characterized, and tested novel design for flexible polymer fiber neural probes for simultaneously stimulating and recording neural activity in damaged spinal cord neurons
- Characterized electrically, mechanically, and optically, as well as *in vivo* using mice

OTHER RELEVANT EXPERIENCE

Data Science Intern, nference Inc. Jul–Sep 2018
Cambridge, MA

- Developed new NLP-based method for identifying interactions between genes from unstructured text, including both nature and directionality of interaction
- Full-stack software development for integrating results into web platform

Computational Biology Intern, Biogen Inc. Jun–Aug 2017
Cambridge, MA

- Developed network-based method for biological hypothesis generation
- Combined literature-based knowledge base with experimental evidence to prioritize novel drug targets and mechanisms of action, mitigate human biases, and accelerate discovery over 10x

Scientific Editor, eWorldEditing.com Inc. 2016–2018
Remote, part-time

- Technical editing for scientific papers written by non-native speakers to prepare them for publication, including papers in basic sciences, engineering, and computer science

Data Analyst Intern, AkzoNobel Decorative Coatings. Jun–Aug 2016
Amsterdam, the Netherlands

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

Research Scientist Intern, EnerG2 Technologies Inc. Jun–Aug 2015
Seattle, WA

- Developed novel low-cost silicon-carbon composite anodes for lithium-ion batteries, resulting in improvements in both capacity and cycle stability
- Designed and led research project to determine the effect of particle size on properties pre- and post-processing

TEACHING

Teaching Assistant, Stanford University Jun 2021–present
BMI 224, Principles of Pharmacogenomics

- Course administration and management, grading, student feedback

Teaching Assistant, Stanford University 2019-2020
BMI 214, Representations and Algorithms for Computational Molecular Biology

- Curriculum design, programming project writing and design, planning and presenting lectures, grading, running office hours both in person and remote

MENTORSHIP & SERVICE

Summer Research Scholar Jun–Aug 2021
Stanford Summer Research Program/Amgen Scholars Program

- Mentoring for bioinformatics research project, with focus on research design, programming skills, data analysis/presentation, and preparation for graduate study

Foothills College Student Mar–Jun 2021

Stanford University Inclusive Mentorship in Data Science Program

- Data science techniques, research project design, and career advice mentoring for underrepresented students in local community colleges

Biomedical Informatics Rotation Student Jun–Sep 2020

Russ Altman lab, Stanford University

- Mentoring first-year PhD student rotation project; student is now full-time lab member

PUBLICATIONS

1. **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). https://www.biorxiv.org/content/10.1101/2021.09.30.462647v2
   - Selected for talk at Pacific Symposium on Biocomputing, Jan. 2022, Hawaii.

2. Townshend, R. J. L., Vogele, M.*, Suriana, P.*, **Derry, A.***, Powers, A., Laloudakis, Y., Balachandar, S., Eismann, S., Altman, R. B., & Dror, R. O. (2021). ATOM3D: Tasks On Molecules in Three Dimensions. *NeurIPS 2021 Datasets and Benchmarks Track*. http://arxiv.org/abs/2012.04035
   - Selected for virtual talk at NeurIPS Learning Meaningful Representations of Life workshop, Dec. 11, 2020.

3. Anand-Achim, N., Eguchi, R. R., Mathews I. I., Perez C. P., **Derry, A.**, Altman, R. B., & Huang, P.-S. (2020). Protein Sequence Design with a Learned Potential. *bioRxiv*. https://doi.org/10.1101/2020.01.06.895466

4. 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*. https://doi.org/10.26434/chemrxiv.12009582.v1

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). https://doi.org/10.1142/9789811215636_0041
   - Selected for talk at Pacific Symposium on Biocomputing, Jan. 2020, Hawaii.

6. 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). https://doi.org/10.1126/sciadv.1600955