Patrick Heenan

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Work Experience

May 2023 —Present | Senior Scientist at Enveda Biosciences

Oct 2022 —May 2023 | Scientist II at Enveda Biosciences

Data analysis/visualization, multi-project leadership

As project and biology lead, simultaneously led up to three projects, for a total of five hit confirmation projects, three hit-to-lead projects, and two lead optimization projects. *Lead a team of 5-10 collaborators* for each project to key decision points and routinely coded interactive data visualization dashboards and machine learning applications to improve quality and visibility of scientific decision making. As part of a matrixed work environment, supported other projects with chemoinformatics analysis, algorithm development, and assay development consultation for diverse data sets including multiple plate-based biophysical/biochemical assays, single cell time series, phosphoproteomics, and gene ontology analyses.

Jul 2021 —Aug 2022 | Cheminformatics Scientist II at Ribometrix

Dec 2019 —Jul 2021 | Cheminformatics Scientist I at Ribometrix

Assay development, data analysis/visualization, project leadership

Collaborated with wetlab scientists in the development and optimization of assays, algorithms, and data visualizations to enable novel measurements, including *order-of-magnitude increases in throughput* and *20-fold improvements* in analysis runtimes. As project and biology lead for AML-focused hit-to-lead project, *lead a team of 10 collaborators* to key decision points and routinely coded interactive data visualization dashboards and machine learning applications to improve scientific decision making.

Aug 2014 —Dec 2019 | Graduate Research Assistant, University of Colorado, Boulder

Single-molecule data analysis and method development

Developed an algorithm with a *30-fold accuracy increase* over state of the art for predicting events in biophysical time series data, created a method with an *8-fold increase in imaging throughput.*

Aug 2013 —Aug 2014 | Analyst, Southwest Research Institute

Data analysis and firmware development

Developed a computational framework to *reduce code complexity by three-fold* for vehicle monitoring architecture, leveraged *simulation and data acquisition* for smart grid technology resulting in a patent, *firmware development* for time-coherent, long-distance radios resulting in *order-of-magnitude reduction in instrumental noise.*

Education

Aug 2014 —Dec 2019 | Doctorate in Physics, Certificate in Interdisciplinary Quantitative Biology
University of Colorado, Boulder. Adviser: Tom Perkins

Aug 2014 —May 2017 | Master of Science in Physics, Master of Science in Computer Science
University of Colorado, Boulder. Adviser: Rafael Frongillo

Aug 2009 —May 2013 | B.A. in Computer Science, B.S. in Physics
University of North Carolina at Chapel Hill
Gpa: 3.72, graduated with Highest Honors and Distinction

Publications

(*1*) Heenan, P. R., Wang, X., Gooding, A. R., Cech, T. R., and Perkins, T. T. (2020). Bending and looping of long DNA by Polycomb repressive complex 2 revealed by AFM imaging in liquid. *Nucleic Acids Research 48*, Publisher: Oxford Academic, 2969–2981.

(*2*) Heenan, P. R., and Perkins, T. T. (2019). Imaging DNA Equilibrated onto Mica in Liquid Using Biochemically Relevant Deposition Conditions. *ACS Nano 13*, 4220–4229.

(*3*) Yu, H., Heenan, P. R., Edwards, D. T., Uyetake, L., and Perkins, T. T. (2019). Quantifying the Initial Unfolding of Bacteriorhodopsin Reveals Retinal Stabilization. *Angewandte Chemie International Edition 58*, 1710–1713.

(*4*) Heenan, P. R., and Perkins, T. T. (2018). FEATHER: Automated Analysis of Force Spectroscopy Unbinding and Unfolding Data via a Bayesian Algorithm. *Biophysical Journal 115*, 757–762.

(*5*) Heenan, P. R., Yu, H., Siewny, M. G. W., and Perkins, T. T. (2017). Improved free-energy landscape reconstruction of bacteriorhodopsin highlights local variations in unfolding energy. *The Journal of Chemical Physics 148*, 123313.

Computational expertise (Portfolio link)

Languages :	bash, Python, Mathematica, Matlab, C++, **R**
Technologies :	Linux, LaTeX, APIs (REST, CRUD)
	Containerizing (Docker, conda), Machine learning (tensorflow, keras, sklearn)
	Development (ETL, Swagger, git, mercurial, Jenkins, nginx, gunicorn, django)
	Cloud computing (AWS, qsub, Azure), Databases (SQL, postgres)
Chemoinformatics APIs :	rdkit, CAS SciFinder, PubChem, Chemaxon
	Collaborative Drug Discovery Vault, Revvity Signals, Titian Mosaic

Life sciences expertise

In-vitro assays:	Fluorescence polarization, qPCR, RT-PCR, thermal melt
Imaging :	Surface treatment, including silanization and PEG-ylation
	Total internal reflection fluorescence (TIRF) and atomic force microscopy (AFM)
Purification :	Polyacrylamide gel electrophoretic mobility shift assay (PAGE-EMSA)
	Cell culture, plasmid transformation, protein expression
Simulation :	Slurm workload manager, Visual Molecular Dynamics (VMD)
	Nanoscale Molecular Dynamics (NAMD)

Awards and Scholarships

Aug 2014 —Aug 2016	National Science Foundation IGERT 1144807
Aug 2014	SwRI President's Award, "Dynamic Transmission Lines"
Dec 2011 —2013	Kenan-Biddle Society digitial literacy grant
Summer 2011	NASA North Carolina Space Grant for computational astrophysics
2009 —2013	Internet Society grant for establishing, maintaining Wi-Fi network
2009 —2013	Dean's List

Teaching and Volunteer Experience

Spring 2019	Conference organizer and 'gopher' for Single Molecule Biophysics 2019
Fall 2018	Guest lecturer (5 classes) with Tom Cech, 'Optical Imaging', MCDB 5312
Fall 2017	Adviser for First-Year Physics Research Seminar, PHYS 1700
Spring 2017	Teaching Assistant for 'Natural Language Processing', CSCI 5832
Spring 2017	Co-Chair of CU IQ Biology Symposium Planning Committee
Fall 2016	Co-Chair of IQ Biology Incoming Student Bootcamp
Spring 2016	CU Graduate Student Mentor