PATRICK CHERRY

PhD scientist skilled in data visualization, statistical modeling, bioinformatics, biological data science, next-generation sequencing (NGS), and tool-building. I've coded reproducible and rigorous pipelines for high-throughput experimental designs and multi-omic analyses for communication to technical and non-technical audiences. I've launched best-in-class oncology reference standards, and invented new molecular methods for DNA and microbe manipulation. Originally trained in Molecular Biology,I am passionate about advancing data science and bioinformatics to improve human health and biotechnology.

EDUCATION

2019 | 2013

PhD

University of Colorado School of Medicine — Aurora/Denver, Colorado

- Ph.D. in Molecular Biology
- Advisor: Jay Hesselberth, PhD.
- Thesis: RNA Terminus chemistry affects the decay events that target HAC1 mRNA during the Unfolded Protein Response

2013 | 2009

BA

Hendrix College — Conway, Arkansas

- Biochemistry and Molecular Biology, with Distinction
- Advisor: Andres Caro, PhD.
- Senior Capstone Project showing key stress response gene expression changes to oxidative stress in liver cells
- Minor in Mathematics; PI: Lars Seme; Project: Newton's method as a fractal chaotic dynamical system

INDUSTRY EXPERIENCE

Current | 2022

Senior Scientist

Twist Bioscience — South San Francisco, California

- Tech Lead of multiple reference control NPIs and custom OEMs; collaborated cross-functionally to launch quality products; includes the *Pan-cancer RNA Fusion Controls*, *Fragmentome Calibration Controls*, *CNV Controls*, *Pan-cancer cfDNA v2*, and RNA-seq.
- Mentored a direct report from Senior Research Associate to Scientist to serving as a Tech Lead on new product introductions. Managed research assistants to produce quality science on deadline.
- Original research led to multiple outside presentations and patent protection of product configuration and biochemical methods. Designed and implemented high-throughput RNA synthesis and pooling.
- Routinely craft custom data analysis pipelines in R and Python; documented analyses using `Rmarkdown`, `Quarto`, and `Jupyter`; maintain dockerized git / Github bioinformatic QC packages for Pan-cancer cfDNA standard and the Pan-cancer RNA Fusion Controls; used public databases and feedback from alpha testers to design configuration of multiple products.
- Led new technology evaluation of a new NGS platform with custom experiments and bioinformatic analyses in Python, R, and SQL to enable faster gene QC in Production. Also led ancillary experiments to speed up synthetic gene production. Coded, implemented, and distributed on company GitHub an internal package, `twistcolorpal`, that automatically adds Twist-brand colors to `ggplot2` plots and sets up database connectors to `SQL` / Snowflake for parameterized `dbplyr` querying. Regularly use R, tidyverse, Python, Polars, AWS `s3`, `Spark`, `PySpark`, and `Sparklyr`, locally and on Databricks. Regularly implements and runs automated code tests with `pytest` and `testthat`.

CONTACT

- pcherry [at] pm dot me
- upon request
- Senior Scientist | Genomics
- Twist Bioscience
- San Francisco, California
- pdcherry.github.io
- github.com/pdcherry
- linkedin.com/in/p-cherry
- United States Citizen

I currently split my time between wet lab and computational activities. I have worked in a variety of roles ranging from HTP strain onboarding to genomics scientist. I like collaborative environments where I can learn from my peers and in turn teach others.

Last updated on 2024-03-21.

Data-driven résumé made in R using pagedown.

Current | 2021

Scientist

Twist Bioscience — South San Francisco, California

- Tech Lead of *Pan-Cancer Reference Standard*, an ISO-13485 synthetic positive control with 458 unique variants among 84 cancer-associated genes at six QC'd VAFs, plus a WT control; launched in Nov of 2021.
- Designed, implemented, & validated widely-used primer removal procedure for DNA standards and more.
- Devised and validated precise high-throughput DNA quantification process for accurate pooling. On-boarded droplet digital PCR (ddPCR) system into production; designed and validated custom ddPCR assays for use in production.
- Led multiple iterations of custom NGS analysis; refined the QC approach and thresholds for ensuring a contamination-free production process; extensively used data visualization to communicate complex data to cross-functional teams.
- Made extensive use of UMI sequencing and created novel method to rigorously quantify library conversion efficiency to evaluate products and reference materials

2021 | 2019

Scientist I

Zymergen, Inc. — Emeryville, California

- Designed and implemented an automated high-throughput genotyping assay
- Designed & carried out complex experiments on automation with and without LIMS sample tracking
- Supported a company-wide NGS core under high demand from diverse groups with complex needs using data-driven decision making and teaching
- Used statistical methods to screen and optimize a genetic engineering protocol for newly-on-boarded microbe; delivered robust process while working on New Product Introduction team
- Built hundreds of plasmids using modern molecular cloning techniques like Gibson and Golden Gate

RESEARCH EXPERIENCE

2019 | 2014

Doctoral Research

University of Colorado School of Medicine — Aurora/Denver, Colorado

- Wrote, revised, & published two academic papers on RNA repair & yeast genetics
- Engineered and characterized genetic bypass of essential genes in budding yeast; on-boarded CRISPR/Cas9 for efficient and precise gene knock-in
- Expressed, purified, and used wild-type and mutant recombinant protein in *E. coli* to carry out an RNA modification enzymatic assay
- Optimized custom RNA-seq library protocol; independently planned, executed, troubleshooted RNA modification detection
- Routinely conducted northern blotting, targeted depletion, primer extension, splinted ligation, and other esoteric DNA and RNA experiments

I worked on a few projects during my PhD, and the RNA repair project led me to custom 5´-OH RNA-seq libraries, which inspired my fascination with transcriptomics and bioinformatics.

INTELLECTUAL PROPERTY

3/7/23

Methylation-mediated adapter removal on nucleic acid sequences

Twist Bioscience — South San Francisco, California

- US 63/317,466

11/12/21

Expansion of cfDNA for Libraries

Twist Bioscience — South San Francisco, California

- US Prov. Pat. Ref No 823.102

4/9/21

Libraries for mutational analysis

Twist Bioscience — South San Francisco, California

- US Prov. Pat. Ref No 823.101

Working at Twist and Zymergen on new product research requires confidentiality, but public evidence of accomplishments often comes in patent applications. The Legal teams know me well for being a helpful expert in the process.

3/25/21

Method for counterselection in microorganisms
Zymergen, Inc.
Emeryville, California

• US 2021_0087586 A1

SELECTED PUBLICATIONS

12/21/21

Twist Pan-cancer synthetic reference materials technical guide
Twist Bioscience
South San Francisco, California

• Patrick Cherry & Mike Bocek

2019

Multiple decay events target HAC1 mRNA during splicing to regulate the unfolded protein response
eLife

• Cherry, P., Peach, S., & Hesselberth, J.

2018

Genetic bypass of essential RNA repair enzymes in budding yeast
RNA

• Cherry, P., White, L., York, K., & Hesselberth, J.

I communicate my results clearly, both in writing and in live presentations. I enjoy writing research papers, but my career has required more tech notes and app notes recently.

SELECTED PRESENTATIONS & TALKS

11/19/23

High sensitivity detection of specific ultra low-frequency somatic mutations for minimal residual disease (MRD) monitoring
International Society of Liquid Biopsy Annual Congress
Madrid, Spain

4/16/23

Twist pan-cancer synthetic RNA fusion control for assay development
American Association for Cancer Researchers
Orlando, Florida

2/7/23

Use of synthetic CNV fragments to mimic copy number alterations for ctDNA reference standards
Advances in Genome Biology and Technology
Hollywood, Florida

4/12/22

Twist pan-cancer synthetic reference materials for cell-free DNA (cfDNA) assay development
American Association for Cancer Researchers
New Orleans, Louisiana

7/13/21

Molecular Methods Meet the Standards: Or how I learned to stop worrying and love UV-quantification
Twist R&D Meeting
South San Francisco, CA

6/16/20

R use at Zymergen
Z-Tech Talk
Emeryville, CA

4/20/20

Data-driven troubleshooting of NGS experiments
Data Science Talk
Emeryville, CA

I give audience-centered presentations by adapting on the fly and over time to the venue and occasion. I like to *transfer knowledge* by giving methods/best practices talks whose slides can also serve as documentation.