Patrick Cherry's CV

PhD scientist skilled in data visualization, statistical modeling, bioinformatics, 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 analyzed NGS data from Illumina, MGI, and Element. Originally trained in Molecular Biology, I am passionate about advancing data science and bioinformatics to improve human health and understand biology.

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

Last updated on 2024-05-22.

Data-driven résumé made in R using Quarto.

Education

PhD

University of Colorado School of Medicine

Aurora/Denver, Colorado

2019 - 2013

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

BA

Hendrix College

Conway, Arkansas

2013 - 2009

- 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

Senior Scientist, Genomics

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.

Twist Bioscience

South San Francisco, California

2024 - 2021

- Invented and introduced multiple new products to market yielding millions of dollars in new revenue as *Tech Lead*, including: *Pan-cancer cfDNA* (v1 & v2), *CNV Controls*, *RNA Fusion Controls*, *Fragmentome Controls*, and RNA-seq
- Answered biological and business quesitons with reproducible exploratory analysis using `R` and the libraries: `dplyr`, `dbplyr`, `DBI`, `purrr`, `ggplot2`, `Bioconductor`, `DEseq2`, `seurat`, `tidymodels`, `glm`, `nls`, `lme4`, and more
- Edited and mainteined production QC pipelines with automated reporting using `Python` and the libraries: `numpy`, `pandas`, `polars`, `seaborn`, `statsmodels`, `biopython`, `pybedtools`, `pysam`, `vcfpy`, `scanpy`, and others
- Mintained production code (`git` version control with code review) and operated in high-performance compute environment `aws s3` & `ec2` and `Databricks` using Unix shell / `bash` tools, like `STAR-fusion`

- Authored internal `R` package "`twistcolorpal`" on Github with help files to help scientists style plots to Twist branding

Scientist, Genomics

Twist Bioscience

South San Francisco, California

2024 - 2021

- As Tech Lead, launched the Twist *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, and earned $1 million in new revenue in first year
- Identified and optimized compatible ddPCR assays using web scraping in `R` with `rvest` for cfDNA quality control
- Used Python to author automated data / QC reports using `Jinja2` (with `CSS`) and `WeasyPrint`
- Managed data and ran bioinformatic analyses on Illumina RNA & DNA seq using bash tools `awk`, `grep`, `scp`, `wget`, `ssh`, `bwa`, `bedtools`, `samtools`, `vcftools`, `UMI-tools/fgbio`
- Wrote original `SQL` queries for `Snowflake`-based database to answer production and business questions.

Scientist I, NGS & NPI-Build

Zymergen, Inc.

Emeryville, California

2021 - 2019

- Boosted *NGS Core* genotyping success by 45% using data-driven decision-making and teaching; Guided demanding and diverse internal customers on complex NGS experiments

- Built and disseminated `Rmarkdown` notebook for autonomous NGS data exploration
- Coded build and QC experiments using Zymergen's `Drawbridge` alembic API Python library to LIMS
- Rendered strain build and plasmid build reports from LIMS `SQL` database in `MySQL` Workbench

Research Experience

Doctoral Research

University of Colorado School of Medicine

Aurora/Denver, Colorado

2019 - 2014

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.

- 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 and scarless knock-out
- Performed RNA-seq analysis with `bowtie2` on departmental cluster using `bjobs` and visualization in R-Studio server
- 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

Undergraduate Research Assistant

Lab of Dr. Andres Caro, Hendrix College

Conway, Arkansas

2013 - 2012

Summer Undergraduate Research Fellowship

Lab of Dr. Michael Shiloh, UT Southwestern Medical Center

Dallas, Texas

2012 - 2012

Research Assistant

Lab of Dr. Joy Sturtevant, Louisiana Health Sciences Center

New Orleans, Louisiana

2011 - 2010

Intellectual Property

Methylation-mediated adapter removal on nucleic acid sequences

Twist Bioscience

South San Francisco, California

3/7/23

- US 63/317,466

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.

Expansion of cfDNA for Libraries

Twist Bioscience

South San Francisco, California

11/12/21

- US Prov. Pat. Ref No 823.102

Libraries for mutational analysis

Twist Bioscience

South San Francisco, California

4/9/21

- US Prov. Pat. Ref No 823.101
- Configuration and fabrication of synthetic DNA & RNA reference standards and synthetic variant sequences

Method for counterselection in microorganisms

Zymergen, Inc.

Emeryville, California

3/25/21

- US 2021_0087586 A1
- Demonstration of novel counterselection mechanism in non-model *Bacillus* microbe for genetic modification

Selected Publications

Twist cfDNA Pan-Cancer Reference Standard v2 Technical Guidance

Twist Bioscience Product Sheet & FAQ

South San Francisco, California

1/4/24

- Patrick Cherry, Lydia Bonar, & Mike Bocek

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.

Characteristics and specificity of the wild-type / 0% VAF reference material

Twist Bioscience

South San Francisco, California

4/22/22

- Patrick Cherry & Mike Bocek

Twist Pan-cancer synthetic reference materials technical guide (depricated)

Twist Bioscience

South San Francisco, California

12/21/21

- Patrick Cherry & Mike Bocek

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

eLife

Aurora/Denver, Colorado

3/19/19

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

Genetic bypass of essential RNA repair enzymes in budding yeast

RNA

Aurora/Denver, Colorado

12/6/17

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

Selected Presentations & Talks

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.

Twist pan-cancer reference standard V2: Enhanced precision and reduced errors in ctDNA analysis

Advances in Genome Biology and Technology

Orlando, Florida

2/6/24

- Lydia Bonar, *Patrick Cherry*, Michael Bocek, Shawn Gorda, Derek Murphy, and Esteban Toro

High sensitivity detection of specific ultra low-frequency somatic mutations for minimal residual disease (MRD) monitoring

International Society of Liquid Biopsy Annual Congress, Twist Bioscience

Madrid, Spain

11/19/23

- Tina Han, Tong Liu, Michael Bocek, *Patrick Cherry*, Shawn Gorda, Nairi Pezeshkian, Dan Nasko, Po-Yuan Tung, Derek Murphy, and Esteban Toro

Twist pan-cancer synthetic RNA fusion control for assay development

American Association for Cancer Researchers, Twist Bioscience

Orlando, Florida

4/16/23

- Patrick Cherry, Jason Corwin, Yu Cai, Kit Fuhrman, Jean Challacombe, Derek Murphy, Esteban Toro

High sensitivity detection of specific ultra low-frequency somatic mutations for minimal residual disease (MRD) monitoring

American Association for Cancer Researchers, Twist Bioscience

Orlando, Florida

4/19/23

- Tong Liu, Michael Bocek, *Patrick Cherry*, Shawn Gorda, Jean Challacombe, Derek Murphy and Esteban Toro

An end-to-end workflow for accurate methylation detection

American Association for Cancer Researchers, Twist Bioscience

Orlando, Florida

4/19/23

- Lydia Bonar, Kristin Butcher, Michael Bocek, Holly Corbitt, Bryan Hoglund, Cibelle Nassif, *Patrick Cherry*, Derek Murphy, Jean Challacombe, Esteban Toro

Colorado RNA Club Industry Session

Colorado RNA Club

Boulder, Colorado

4/10/23

Use of synthetic CNV fragments to mimic copy number alterations for ctDNA reference standards

Advances in Genome Biology and Technology

Hollywood, Florida

2/7/23

- Jason Corwin, *Patrick Cherry*, Shawn Gorda, Michael Bocek, Jean Challacombe, Derek Murphy, Esteban Toro

Methylation Controls to detect for methylation level quantification in the Twist Targeted Methylation Sequencing workflow

Advances in Genome Biology and Technology

Hollywood, Florida

2/7/23

- Kristin Butcher, Michael Bocek, *Patrick Cherry*, Jean Challacombe, Esteban Toro

Efficient, high sensitivity detection of oncogenic variants with UMIs and target enrichment

European Human Genetics Conference

Vienna, Austria

5/26/22

- Michael Bocek, Lydia Bonar, Jean Challacombe, Richard Gantt, *Patrick Cherry*, Rebecca Liao, Derek Murphy and Esteban Toro

Twist pan-cancer synthetic reference materials for cell-free DNA (cfDNA) assay development

American Association for Cancer Researchers

New Orleans, Louisiana

4/12/22

RNA processing regulates the unfolded protein response

CSHL: mRNA Processing Meeting Talk

Cold Spring Harbor, New York

8/24/17

Turnover of endonucleolytic products of No-Go mRNA decay

RNA Stability Meeting

Estes Park, Colorado

6/2/15

Twist reference material products: current methods and future applications

Twist R&D Symposium

South San Francisco, CA

3/17/22

Pan-cancer Reference Standard: Methods in Automation & Future Needs

Twist Automation Group Meeting

South San Francisco, CA

4/5/22

Pan-cancer Reference Standard: Methods & Lessons from NPI & QC

Twist R&D Meeting

South San Francisco, CA

2/15/22

Molecular Methods Meet the Standards: Or how I learned to stop worrying and love UV-quantification

Twist R&D Meeting

South San Francisco, CA

7/13/21

R use at Zymergen

Z-Tech Talk

Emeryville, CA

6/16/20

Data-driven troubleshooting of NGS experiments

Data Science Talk

Emeryville, CA

4/20/20

NGS Sample Preparation Deep-Dive

NGS Technical Talk Series

Emeryville, CA

3/27/20

Colorado RNA Club Industry Session

Colorado RNA Club

Boulder, Colorado

4/10/21

RNA terminus chemistry potentiates decay events that target HAC1 mRNA during the unfolded protein response

Thesis Defense Seminar

Aurora, Colorado

1/18/19

RNA modification and decay regulates the unfolded protein response

Rocky Mountain Yeast Meeting Poster

Fort Collins, Colorado

1/11/19

What the unfolded protein response teaches us about RNA decay

Bolie Scholar Talk, Molecular Biology Program Retreat

Winter Park, CO

10/27/18

Genetic bypass of essential yeast RNA repair enzymes

Rocky Mountain Yeast Meeting Poster

Golden, Colorado

1/8/18

Genetic bypass of essential yeast RNA repair enzymes

Molecular Biology Program Update Talk

Aurora, Colorado

10/29/17

Genetic bypass of essential yeast RNA repair enzymes

Rocky Mountain Yeast Meeting Poster

Boulder, Colorado

1/9/17

RNA processing regulates the unfolded protein response

RNA Club Talk

Boulder, Colorado

12/6/16

RNA Healing and Destruction

Molecular Biology Program Update Talk

Aurora, Colorado

10/28/16

RNA processing regulates the unfolded protein response

Rocky Mountain Yeast Meeting Poster

Fort Collins, Colorado

1/8/16

RNA 5 -kinase-mediated co-translational mRNA decay

Molecular Biology Program Update Talk

Aurora, Colorado

2/8/15

RNA 5 -kinase-mediated co-translational mRNA decay

Rocky Mountain Yeast Meeting Poster

Aurora, Colorado

1/9/15

RNA 5 -kinase-mediated co-translational mRNA decay

Rocky Mountain Yeast Meeting Poster

Boulder, Colorado

1/10/14

Coordinated upregulation of antioxidant protection and mitochondrial DNA biosynthesis in liver cells by oxidative stress

Senior Undergraduate Capstone Research Talk

Conway, Arkansas

2013

Trainees & Direct Reports

Derek Cai, BS, University of California San Diego, Research Associate I

Twist Bioscience

South San Francisco, California

2024 - 2022

While I've not held a role with "manager" in the title, all Scientist positions I've accepted have involved formal report management responsibility. I take managing and mentoring seriously; I emphasize trust, learning, and growth with my reports.

Lydia Bonar, MS, Johns Hopkins University, Scientist

Twist Bioscience

South San Francisco, California

2024 - 2021

Alonzo Lee, BS, University of California Santa Cruz, Scientist

Twist Bioscience

South San Francisco, California

2022 - 2021

Kaisle Hill, BA, University of California Berkeley, Senior Research Associate

Zymergen, Inc.

Emeryville, California

2021 - 2020

Rachel A Jones, MS, University of Arizona, Postdoctoral Fellow

University of Colorado School of Medicine

Aurora/Denver, Colorado

2017

Laura K White, MS, Biotechnology, Johns Hopkins University, Postdoctoral Fellow

University of Colorado School of Medicine

Aurora/Denver, Colorado

2016

Haven Himmighoefer, Undergraduate, University of Colorado Denver

University of Colorado School of Medicine

Aurora/Denver, Colorado

2016 - 2014

Leslie Aranda, Undergraduate, University of California Riverside

University of Colorado School of Medicine

Aurora/Denver, Colorado

2015