

Cody McDonald

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SUMMARY

Multidisciplinary Scientist with 8+ years of experience bridging the gap between complex wet-lab biology and laboratory automation. Specialized in **AAV/Lentiviral vector design**, **Cell Based Assays and Automation**, **CRISPR Cell Line Engineering**, **Process Development** and **Flow Cytometry**. Unique ability to identify workflow bottlenecks and design custom hardware solutions (CAD/3D Printing) to increase assay throughput.

SKILLS

Lab Automation & Hardware: Rapid Prototyping (Fusion360 CAD, FDM 3D Printing), Custom Labware Fabrication, High-Throughput Screening (HTS) Hamilton Vantage, Bio-MEK, HP- Liquid printer, Thermofisher multi-drop, Agilent Bravo, King-fisher

Cell Biology & Gene Editing: siRNA/miRNA mediated knockdown, CRISPR/Cas9 Knockout/Knock-in, Lentiviral & AAV Production (2nd/3rd Gen), Cell Line Development (Clonal/Pooled), iPSC & Primary Cell Culture, T-Cell Engineering

Analytical Assays: Flow Cytometry (FACS/Sorting), ddPCR/qPCR, ELISA, Western Blot/Silver Stain, NGS Library Prep, Nanostar(Aggregation), Pherastar, TapeStation, Zetasizer (DLS and Zeta potential)

Data & Software: Python (Data parsing/Scripting), GraphPad Prism, FlowJo, Benchling, SoftMax Pro, Incucyte image analysis

In vivo: Mouse study design for biodistribution, tissue selection, storage and downstream processing, block freezing and tissue slicing, fluorescent staining and analysis

GMP: Trained in GDP and QC lab environment

EXPERIENCE

Scientist, Neurocrine Biotechnology

04/2023 – 01//2026 · San Diego, CA

- **AAV Capsid Discovery:** Led the design, cloning and viral production of novel capsid variants targeting Blood-Brain Barrier (BBB) penetrance. Successfully generated several internally developed capsids using novel IP that demonstrated CNS expression in animal models.
 - **Cell based Assay Development:** Designed a small scale AAV harvesting pipeline to screen capsid variants in 96 well scale, and rapidly advance candidates to in vivo studies based on flow cytometry verified incucyte plate based assay imaging.
 - **In vivo/Biodistribution:** designed (DOE) and performed 2 multi month studies for mouse model BBB penetrance with novel AAV capsid candidates, designing variants, advancing top candidates from cell based assay to be injected by In-vivo team. Received harvested liver and brain tissue and performed DNA and RNA extraction, followed by final NGS analysis from biodistribution of capsid variants using existing Python/PANDA data pipeline, as well as fluorescent analysis from sliced frozen tissue.
- **Process Optimization and Custom Hardware Engineering:** Designed and fabricated a novel 96-well magnetic purification station via CAD and 3D printing. This custom device enabled the transition from manual tube-based processing to a semi-automated high-throughput screening platform, increasing weekly throughput from 12 to 96 variants tested. Engineered custom 3D-printed centrifuge adapters and ergonomic fixtures to

resolve safety hazards (needle sticks) and improve viral yield consistency during iodixanol gradient purification.

- **Mentorship:** Managed daily operations for Expi293 suspension productions and adherent neurological cell lines (SH-SY5Y), while supervising junior staff and interns, including a 3 month summer intern.
- **Transfection & Delivery Optimization:** Led process development project to optimize the delivery of plasmid to target production cells, utilizing LNP-based transfections focused on modifying the content and ratio of plasmid concentrations to improve AAV particle fullness and functional titer, resulting in 100% improvement and successful process transfer to the new production and scale up team. Included SOP development for viral dna harvesting, and DPCR process, also successfully transferred to downstream teams.
- **Analytical Characterization:** Conducted high-resolution nucleic acid quantification and integrity analysis using Tapestation and ddPCR, as well as coordination with ELISA, Silver stain and aggregation/integrity for AAV particle analytics as part of potency and release assay development; utilized Python to automate large-scale sequence verification datasets.

Principal Research Associate, Fate Therapeutics

09/2022 – 03/2023 · San Diego, CA

Recruited for a senior technical role in cell line engineering; position eliminated during company-wide corporate restructuring shortly after onboarding.

- Selected to drive cell line engineering strategy for iPSC-derived T-cell therapies.
- Utilized transition period to upskill in CAD design and hardware fabrication, developing the prototyping skillset later deployed at Neurocrine.

Senior Research Associate, Sana Biotechnology

04/2019 – 06/2022 · Boston, MA

- **Cell line engineering Pipeline Development:** Established a robust cell line engineering core, developing a design-to-bank pipeline for ~40 pooled and clonal cell lines used in antibody screening assays for CAR-T treatment
 - **Lentiviral Engineering:** Created and optimized a lentiviral based protein overexpression pipeline for high stability long term expression of ~20 custom cell lines for downstream antibody screening assays
 - **CRISPR knockout/knockin:** In parallel created a RNP based CRISPR knockout pipeline to mirror cell lines with an overexpression
 - **Expression modulation:** Utilized various miRNA and siRNA strategies either inline with lentiviral designs or for short term knockdown assays as needed per experiment
 - **Recombinase Mediated cassette exchange platform:** Took over the project to generate a rapid/multiple exchange platform for a CRISPR based knockin of a BXB1 cassette, which was then capable of library based screens as well as increased turnaround for a clonal cell line capable of novel protein expression
- **Flow Cytometry:** Managed 3-4 color FACS workflows for pooled and clonal cell line isolation, as well as for a variety of other cell based assays detecting expression of CD4 and CD8+ cell line characterization
- **Cell Culture:** Managed the culture, editing and banking of a wide variety of cells including HEK 293, HEP G2, Jurkat, neuronal progenitor cells

- **Process Development:** Developed and optimized a standardized QC and banking process for engineered lines using **Benchling**, ensuring data integrity and traceability for the R&D organization.

Research Associate, Generation Bio

06/2018 – 01/2019 · Boston, MA

- Generated a process pipeline to transfect with LNP, lyse and process baculovirus transduced SF9 insect cells and extract the company's novel plasmid like closed ended DNA product for downstream experimental testing
- Resulted in a 100% speed improvement week over week, from process optimizations as well as lab buildout and design around the process

Research Associate, Vertex

06/2017– 8/2018 · San Diego, CA/Boston, MA

Worked a four part internship which included a series of 3 month projects.

- Generating an over 90% a human lung cell cystic fibrosis gene knockout using then newly developed CRISPR protocol
- Taking over the automation and running of a high throughput screening for a small molecule drug screening assay
- Running a custom in house western blot assay where I successfully identified the binding site for a small molecule drug
- Developed and ran a cell line screening assay on neuronal stem cells, first detecting cDNA expression, proving comparison to FACS results and then generating high throughput results using a plate reader

EDUCATION

10 Graduate Level courses, Biotechnology, Harvard University Extension School

10/2021 · Boston, MA

B.A. Biology, Arcadia University

05/2016 · Philadelphia, PA