Benjamin Mark Lewis

Neuro-StemCell-Data Scientist | Multi-Omic Discovery

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Professional Experience

Bioinformatics Scientist II, Research and Development **April 2024 - Present**
Actio Biosciences – San Diego, CA

- Lead biomarker discovery and novel target identification through integrative analysis of metabolomics, proteomics, and transcriptomics datasets across therapeutic programs.
- Drove new target identification efforts resulting in multiple targets advancing to program nomination.
- Project design and data analysis lead for single-cell and bulk transcriptomics.
- Designed and deployed an end-to-end, raw-read-to-result bulk RNA-seq pipeline (Nextflow + Python, AWS), reducing TAT from 2 weeks to <48 hours and standardizing deliverables across R&D programs.

Scientist I, Research and Development **March 2022 – March 2024**
Aspen Neuroscience – San Diego, CA

- Cross-functional role bridging wet lab and dry lab.
- Single-cell transcriptomics/multiomics: project design and data analysis lead.
- Functional genomics for pipeline development: project design and data analysis lead.
- Contributed to preclinical and IND-enabling studies to support regulatory filings and clinical progression.

Research and Development Intern, Hardy Diagnostics, Santa Maria, CA **June 2013–December 2013**

- Developed chromogenic diagnostic media formulations and authored protocols for 510(k) validation studies.

Education

Ph.D. in Molecular Biology **2022**
University of California, San Diego, CA.

- Co-advisors: Dr. Tony Hunter and Dr. Gene Yeo.
- Thesis project focus: Bioinformatic analysis of RNA-binding proteins and mitochondrial biology.

M.S. in Biology, Specialization: Stem Cell Research and Technology **2015**
B.S. in Biochemistry and Microbiology (Double Major) **2013**
California Polytechnic State University, San Luis Obispo, CA

Key Qualifications and Skills

- Multiomic data analysis – Single cell multiomics | Transcriptomics, Proteomics, ATAC-seq, CLIP-seq.
- Bioinformatics and statistical analysis | Predictive machine learning model design and implementation.
- Coding skills – Python, pandas, matplotlib/seaborn, scikit-learn, scanpy/adata, scvi-tools, PyTorch.
  - Linux, AWS, Cloud/High-performance computing environments, GitHub, R.
  - IBM Data Science Professional Certificate | IBM AI Engineering Professional Certificate.
- Molecular Biology – Viral vector design/production | Gene cloning and DNA assembly techniques.
- Gene expression analysis – NGS/qPCR| RNA manipulation and analysis techniques | Immunoblotting .
- Cell Culture – CRISPR/Cas9 gene-editing in iPSCs & cell lines | Stem cell-based disease modeling.
- Cellular Analysis – Extracellular flux analysis | Flow cytometry techniques and analysis (FACS) | Live Cell imaging.
- Immunofluorescence microscopy – Confocal, Brightfield, Plate scanner.

Publications

"LARP4 Is an RNA-Binding Protein That Binds Nuclear-Encoded Mitochondrial mRNAs To Promote Mitochondrial Function"

- **Benjamin M. Lewis,** Chae Yun Cho, Hsuan-Lin Her, Orel Mizrahi, Gene W. Yeo, Tony R. Hunter.
- RNA, November 2023.

"Autologous and Heterologous Cell Therapy for Hemophilia B toward Functional Restoration of Factor IX"

- Suvasini Ramaswamy, Nina Tonnu, Tushar Menon, **Benjamin M. Lewis**, Kevin T. Green, Derek Wampler, Paul E. Monahan, Inder M. Verma.
- Cell Reports, May 2018.

"*Functional Gene Correction for Cystic Fibrosis in Lung Epithelial Cells Generated from Patient iPSC*"

- Amy L. Firth, Tushar Menon, Gregory S. Parker, Susan J. Qualls, **Benjamin M. Lewis**, Eugene Ke, Carl T. Dargitz, Rebecca Wright, Ajai Khanna, Fred H. Gage, Inder M. Verma.
- Cell Reports, September 2015.

"Drosophila Muller F Elements Maintain a Distinct Set of Genomic Properties Over 40 Million Years of Evolution"

- G3-Genes|Genomes|Genetics article, May 2015

Research Training

Ph.D. Student, UCSD Biology department **Summer 2015-March 2022**

Laboratory of Tony Hunter (Co-Advisor) – Salk Institute, La Jolla, CA
Laboratory of Gene Yeo (Co-advisor) - University of California, San Diego, CA

- Ph.D. Project Focus: Post-transcriptional regulation of nuclear encoded mitochondrial mRNAs
- Analysis of CLIP data identified several RNA-binding proteins that bind nuclear encoded mitochondrial mRNAs
- Bioinformatic analysis to show LARP4 binds mRNAs encoding for OXPHOS and mito-ribosomal proteins
- Through quantitative proteomics showed that LARP4 depletion triggers reduction in protein levels of targets
- Functional cellular assays to demonstrate LARP4 contributes to mitochondrial function and homeostasis
- Developed methods to study localized translation at the surface of the mitochondria

CIRM Bridges to Stem Cell Research Intern **July 2014 – March 2015**

Laboratory of Inder M. Verma - Salk Institute, La Jolla, CA
Mentor and supervisor: Dr. Tushar Menon, Postdoctoral Researcher

- Completed several CRISPR genome-editing projects in iPSC cell models and in-vivo models
- Generated novel CRISPR-corrected hemophilia B patient derived iPSC lines: Published in Cell Reports
- Designed and constructed the several HDR targeting vectors the in-vitro/in-vivo correction of hemophilia B

Undergraduate Student Research Assistant **January 2012–June 2013**

Laboratory of Pat Fidopiastis- Cal Poly, San Luis Obispo, CA
Mentor and supervisor: Dr. Pat Fidopiastis, Professor

- Developed and performed agar plate based mucinase assay screens on a library of V. *fischeri* transposon mutants
- Performed bioinformatic screens secreted enzymes with potential activity on mucin molecules

Posters

"Proximity-labeling Based Methods for Studying Localized mRNA and Translation at the surface of the mitochondria"

- **Lewis BM**
- Poster presented at the 2018 UCSD Biology Department retreat, Lake Arrowhead, USA

"Genome Editing of Stem Cells to Brewing Yeast"

- **Lewis BM**, Menon T, Black M, and Verma IM
- Poster presented at the 2015 CIRM Bridges Meeting, San Francisco, USA

"Genomic Editing of Stem Cells for Modeling and Therapy of Monogenic Diseases"

- Menon T, Firth AL, Parker GS, Gilmore WB, **Lewis BM**, Qualls SJ, Scripture-Adams D, Zack JA, and Verma IM
- Poster presented at the 2014 Meeting on the Mesa, The Salk Institute, La Jolla, USA

Teaching Experience

Discussion Section Instructor - "Our Energy Future" **Spring 2019**
Discussion Section Instructor - "Computational Neurobiology" **Spring 2018**
Lab Instructor - "Biochemical Techniques" **Fall 2016**
University of California, San Diego, CA
Lab Instructor - "Introduction to Cell and Molecular Biology" **Fall 2013**
California Polytechnic State University, San Luis Obispo, CA

Volunteer Service

Science Fair Judge **2019, 2021**
Greater San Diego Science and Engineering Fair

- Volunteer judge for 7^{th}-8^{th} grade biology science fair projects

Science Fair Mentor **2015**
San Luis Obispo Elementary Science Fair Mentor

- Volunteer mentor for 4^{th} grade elementary student.

References: Available upon request