

Education

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**Stanford University – Stanford, CA**

PhD in Stem Cell Biology and Regenerative Medicine – May 2018.

**Massachusetts Institute of Technology – Cambridge, MA**

BS in Biological Engineering and BS in Biology - June 2011.

Research and Work Experience

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**The Broad Institute, of MIT and Harvard, MIT Department of Chemistry – Cambridge, MA**

*Laboratories of Aviv Regev and Alex Shalek – Helen Hay Whitney Postdoctoral Fellow*

Investigating the generation and activity of tissue resident immune memory cells in response to vaccines for the prevention of infectious disease.

**Stanford University - Stanford, CA**

*Dept. of Epithelial Biology – Prof. Paul Khavari (Thesis Advisor)      Sept. 2012 – Sept. 2018*

Investigating the epigenomic basis of squamous cell carcinoma and epidermal stem cell homeostasis. Developing novel methods for chromosome conformation measurement and high content genetic screens.

**Axcella Health (formerly Essentient, Inc.) – Cambridge, MA**

*Biology Research Associate*

*June 2011 – June 2012*

Joined startup as ninth employee. Designed and executed experiments in microbial synthetic biology to produce novel proteins for treating disorders of human nutrition.

**Massachusetts Institute of Technology – Cambridge, MA**

*Department of Biological Engineering – Professor Ron Weiss*

*December 2009 – June 2011*

Developed a system for rapid reprogramming of genetic logic circuits in *E. coli* using recombineering tools. Separately, designed, constructed, and tested large genetic circuits to direct autonomous multi-step differentiation of human embryonic stem cells.

**China Educational Technology Initiative – Cambridge, MA; Kunming, Xi'an, Yulin, An Xian - China**

*MIT International Science and Technology Initiative*

*January 2010 - August 2010*

Coordinated a three-member team for a three month science education program in four Chinese high schools and universities.

**Center for Genomic Regulation – Barcelona, Spain**

*Systems Biology Initiative – Professor Luis Serrano*

*May 2009 – August 2009*

Analyzed genetic polymorphisms in the EGFR signaling network by developing a computational pipeline to integrate sequence conservation and protein thermodynamics.

**Massachusetts Institute of Technology – Cambridge, MA**

*Department of Biology – Professor Robert Sauer*

*May 2008- June 2009*

Developed a functionally composable synthetic promoter scaffold in *E. coli*. Generated a promoter library and characterized the degree of composability using fluorescent reporters.

*Department of Biological Engineering - Professor Drew Endy*

*September 2007-May2008*

Developed and distributed a tool-kit of genetic parts, protocols, and data analysis techniques to consistently measure promoter activity using an *in vivo* reference standard in *E. coli*.

**Case Western Reserve University - Cleveland, OH**

*Department of Nutrition – Professor Henri Brunengraber*

*June-August, 2007*

Used gas chromatography-mass spectrometry to profile mouse brain tissue. Studied the effects of odd-chain fatty acids on citric-acid-cycle intermediates in metabolic disorders.

**United States Senate – Washington, D.C.**

*Page Program – Appointed by Senator Mike DeWine (Ohio)*

*June 2006*

Responsible for the delivery of correspondence and legislative material within the Capitol complex and management of logistical operation of Senate session.

**Case Western Reserve University - Cleveland, OH**

*Department of Genetics – Professor Matthew Warman*

*June-August 2005, July-August 2006*

Characterized breeding and stress response in a fruit fly model of a genetic bone disorder.

**Selected Publications**

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Ji AL\*, Rubin AJ\*, Thrane K\*, Jiang S\*, Reynolds DL, Meyers RM, Guo MG, George BM, Mollbrink A, Bergenstrahle J, Larsson L, Bai Y, Zhu B, Bhaduri A, Meyers JM, Rovira-Clave X, Hollmig ST, Aasi SZ, Nolan GP, Lundeberg J, Khavari PA: **Multimodal Analysis of Composition and Spatial Architecture in Human Squamous Cell Carcinoma.** *Cell* 2020, 182(2):497-514.e22 \*co-first authors

Rubin AJ\*, Parker KR\*, Satpathy AT\*, Qi Y, Wu B, Ong AJ, Mumbach MR, Ji AL, Kim DS, Cho SW, Zarnegar BJ, Greenleaf WJ, Chang HY, Khavari PA: **Coupled Single-Cell CRISPR Screening and Epigenomic Profiling Reveals Causal Gene Regulatory Networks.** *Cell* 2019, 176(1-2):361-376.e17 \*co-first authors

Rubin AJ\*, Barajas BC\*, Furlan-Magaril M\*, Lopez-Pajares V, Mumbach MR, Howard I, Kim DS, Boxer LD, Cairns J, Spivakov M, Wingett SW, Shi M, Zhao Z, Greenleaf, WJ, Kundaje A, Snyder M, Chang HY, Fraser P, Khavari PA: **Lineage-specific dynamic and pre-established enhancer-promoter contacts cooperate in terminal differentiation.** *Nature Genetics* 2017, 49(10):1522-1528 \*co-first authors

Mumbach MR\*, Rubin AJ\*, Flynn RA\*, Dai C, Khavari PA, Greenleaf WJ, Chang HY: **HiChIP: efficient and sensitive analysis of protein-directed genome architecture.** *Nature Methods* 2016, 13(11):919-922. \*co-first authors

Bao XM, Rubin AJ, Qu K, Zhang J, Giresi G, Chang HY, and Khavari PK: **A novel ATAC-seq approach reveals lineage-specific reinforcement of the open chromatin landscape via cooperation between BAF and p63.** *Genome Biology* 2015, 16:284.

Flynn RA, Do B, Rubin AJ, Khavari PK, and Chang HY: **7SK-BAF axis controls pervasive transcription at enhancers.** *Nature Structural and Molecular Biology* 2016, 23(3):231-238.

Davis JH, Rubin AJ, Sauer RT: **Design, construction and characterization of a set of insulated bacterial promoters.** *Nucleic Acids Research* 2011, 39(3):1131-1141.

Kelly JR, Rubin AJ, Davis JH, Ajo-Franklin CM, Cumbers J, Czar MJ, de Mora K, Gliberman AL, Monie DD, Endy D: **Measuring the Activity of BioBrick Promoters Using an In Vivo Reference Standard.** *Journal of Biological Engineering* 2009, 3(1):4.

Babb JW, Weiss R, Knight T, Rubin AJ: **Bio-Field Programmable Gate Array and Bio Programmable Logic Array: Reconfigurable Chassis Construction.** U.S. Patent application 12/946604. 15 November 2010.