

Mary Ann Allen

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<https://www.colorado.edu/lab/allen/>

Academic Positions

Research Associate Professor- BioFrontiers Institute, University of Colorado Boulder	2023-present
Research Assistant Professor- BioFrontiers Institute, University of Colorado Boulder	2017-2023
Responsible Conduct of Research Coordinator, University of Colorado Boulder	2018-current
Assistant Director of the Boulder Branch of the Crnic Institute for Down Syndrome	2022-current

Education

Ph.D. Molecular, Cellular and Developmental Biology. University of Colorado, Boulder CO Thesis title: "RNA Processing Events Affecting <i>C. elegans</i> Operons: a Computational and Mutational Analysis"	2006-2010
M.S. Cellular and Molecular Biology. University of Wisconsin, Madison WI (2002-2006)	2002-2006
B.A. Biochemistry. Spring Arbor University, Spring Arbor MI	1996-2000

Grants

NIH U2 CHL156291-03S3, supplement; Role PI Data Science for Diverse Scholars in Down Syndrome Research (DS3) Total award: \$65,329 (Direct costs: \$41,744)	05/01/23-04/30/24
NIH U2 CHL156291-02S2, supplement; Role PI Data Science for Diverse Scholars in Down Syndrome Research (DS3) Total award: \$58,328 (Direct costs: \$37,270)	05/02/22-04/30/23
NIH R01 HL156475; Role Co-I The neuromolecular basis of adaptation to bond loss Total award: \$2,602,973 (Direct costs: \$1,702,418)	2/7/22-11/30/26
NIH R01 HL156475; Role PI Function of RUNX1 in diverse Down syndrome tissues Total award: \$1,890,079 (Direct costs: \$1,250,000)	02/01/21-03/31/25

AB Nexus cross-campus grant; Role Co-I Identification of an embryonic cell-intrinsic cancer checkpoint: studying differential transcriptional effects of the proto-oncogene MLL1 versus MLL-ENL in an embryonic system Total award: \$50,000	12/1/20-12/1/21
NIH R01 GM125871A; Role Co-I A Technique for Measuring Transcription Factor Activity Total award: \$1,843,693 (Direct costs: \$1,125,000)	09/25/18-06/30/22
Sie Research Faculty Fellowship	2017-present
Sie Post-Doctoral Fellowship	2014-2017
2013 and 2014 LCI Seed Grants (PI: Dowell), co-authored	2013, 2014
Colorado Biomedical Informatics Training Program	2012-2014
Computational Bioscience Program Training Grant	2011-2012

Publications

Hunter S, Hendrix J, Freeman J, Dowell RD, **Allen MA**. **Transcription dosage compensation does not occur in Down syndrome**. BMC biology. 2023 Nov 10;21(1):228.

Rozen EJ, Ozeroff CD, **Allen MA**. **RUN (X) out of blood: emerging RUNX1 functions beyond hematopoiesis and links to Down syndrome**. Human Genomics. 2023 Sep 5;17(1):83.

Kurland JV, Cutler AA, Stanley JT, Dalla Betta N, Van Deusen A, Pawlikowski B, Hall M, Antwine T, Russell A, **Allen MA**, Dowell R, Olwin B. **Aging disrupts gene expression timing during muscle regeneration**. Stem Cell Reports. 2023 Jun 13;18(6):1325-39.

Lammer NC, Ashraf HM, Ugay DA, Spencer SL, **Allen MA**, Batey RT, Wuttke DS. **RNA binding by the glucocorticoid receptor attenuates dexamethasone-induced gene activation**. Scientific Reports. 2023 Jun 9;13(1):9385.

Sigauke RF, Sanford L, Maas ZL, Jones T, Stanley JT, Townsend HA, **Allen MA**, Dowell RD. **Atlas of nascent RNA transcripts reveals enhancer to gene linkages**. bioRxiv. 2023:2023-12.

Damon LJ, Ocampo D, Sanford L, Jones T, **Allen MA**, Dowell RD, Palmer AE. **Cellular zinc status alters chromatin accessibility and binding of transcription factor TP53 to genomic sites**. bioRxiv. 2023:2023-11.

Cozzolino K, Sanford L, Hunter S, Molison K, Erickson B, Jones T, Ajit D, Galbraith MD, Espinosa JM, Bentley DL, **Allen MA**, Dowell RD, Taatjes D. **Mediator kinase inhibition suppresses hyperactive interferon signaling in Down syndrome**. bioRxiv. 2023 Jul 5.

Cardiello JF, Westfall J, Dowell RD, Allen MA. Characterizing Primary transcriptional responses to short term heat shock in paired fraternal lymphoblastoid lines with and without Down syndrome. bioRxiv. 2023:2023-01.

Hunter S, Sigauke RF, Stanley JT, **Allen MA**, Dowell RD. **Protocol variations in run-on transcription dataset preparation produce detectable signatures in sequencing libraries.** *BMC genomics*. 2022 Mar 7;23(1):187.

Walker CJ, Batan D, Bishop CT, Ramirez D, Aguado BA, Schroeder ME, Crocini C, Schwisow J, Moulton K, Macdougall L, Weiss RM, **Allen MA**, Dowell RD, Leinwand LA, Anseth KS. **Extracellular matrix stiffness controls cardiac valve myofibroblast activation through epigenetic remodeling.** *Bioengineering & translational medicine* 2022, 7(3), p.e10394.

Walker C, Crocini C, Ramirez D, Killaars A, Grim J, Aguado B, Clark K, **Allen M**, Dowell R, Leinwand LA, and Anseth KS **Chromatin remodeling controls activation and persistence of aortic valve fibroblasts.** *Biophysical Journal* 2022. 121, no. 3:: 493a.

Janiszewski LN, Minson M, **Allen MA**, Dowell RD and Palmer AE. **Characterization of Global Gene Expression, Regulation of Metal Ions, and Infection Outcomes in Immune-Competent 129S6 Mouse Macrophages.** *Infection and Immunity*, 2021 89(11), pp.e00273-21.

Walker CJ, Crocini C, Ramirez D, Killaars AR, Grim JC, Aguado BA, Clark K, **Allen MA**, Dowell RD, Leinwand LA, and Anseth KS. **Nuclear mechanosensing drives chromatin remodeling in persistently activated fibroblasts.** *Nature biomedical engineering* (2021): 1-15.

Cardiello JF, Sanchez GJ, **Allen MA**, Dowell RD. **Lessons from eRNAs: understanding transcriptional regulation through the lens of nascent RNAs.** *Transcription*. 2020. 19 Dec 2019. <https://doi.org/10.1080/21541264.2019.1704128>

Sasse SK, Gruca M, **Allen MA**, Kadiyala V, Song T, Gally F, Gupta A, Pufall MA, Dowell RD, Gerber AN. **Nascent transcript analysis of glucocorticoid crosstalk with TNF defines primary and cooperative inflammatory repression.** *Genome Res*. 2019 Sep 13; 29(11): 1753–1765. doi: 10.1101/gr.248187.119.

Smith DG, Martinelli R, Besra GS, Illarionov PA, Szatmari I, Brazda P, **Allen MA**, Xu W, Wang X, Nagy L, Dowell RD, Rook GAW, Brunet LR, Lowry CA. **Identification and characterization of a novel anti-inflammatory lipid isolated from *Mycobacterium vaccae*, a soil-derived bacterium with immunoregulatory and stress resilience properties.** *Psychopharmacology* 2019; 236: 1653.

Melnick M, Gonzales P, Cabral J, **Allen MA**, Dowell RD, Link C. **Heat shock in *C. elegans* induces downstream of gene transcription and accumulation of double-stranded RNA.** *PLoS ONE* 2019, Apr 8;14(4).

Stanley JT, Gilchrist AR, Stabell AC, **Allen MA**, Sawyer SL, Dowell RD. **Two-stage ML Classifier for Identifying Host Protein Targets of the Dengue Protease.** *Pacific Symposium on Biocomputing*. Pacific Symposium on Biocomputing, 31 Dec 2019; 25:487-498 PMID: 31797621

Allen MA. **Train students to navigate ethical swamps.** *Nature* 2019; 568 (7751), 145.

Tripodi I, **Allen MA**, Dowell RD. **Detecting Differential Transcription Factor Activity from ATAC-Seq Data.** *Molecules* 2018 23(5), 1136.

Azofeifa J, **Allen MA**, Hendrix J, Rubin J, Read T, Dowell R. **Enhancer RNA profiling predicts transcription factor activity.** *Genome Research* 2018 28: 334-344.

Ebmeier CC., Erickson B, Allen BL, Allen MA, Liang K, Shilatifard S, Dowell RD, Old WM, Bentley DL, Taatjes DJ. **Human TFIIH Kinase CDK7 Regulates Transcription-Associated Chromatin Modifications.** *Cell Rep.* 2017 Aug 1;20(5):1173-1186.

Lladser M, Azofeifa J, Allen MA, Dowell RD. **RNA Pol II transcription model and interpretation of GRO-seq data.** *Journal of Mathematical Biology* 2017 74: 77.

-----Pre-faculty position publications-----

Azofeifa J, Lladser M, Allen MA, Dowell RD. **An annotation agnostic algorithm for detecting nascent RNA transcripts in GRO-seq.** *IEEE/ACM Trans Computational Biology and Bioinformatics* 2016 Jan 26. pp99.

Azofeifa J, Lladser M, Allen MA, Dowell RD. **FStitch: A fast and simple algorithm for detecting nascent RNA transcripts.** 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics 2014.

Allen MA, Andrysiak Z, Dengler V, Mellert HS, Guarnieri A, Freeman JA, Sullivan KD, Galbraith MD, Luo X, Kraus WL, Dowell RD, Espinosa JM. **Global analysis of p53-regulated transcription identifies its direct targets and unexpected regulatory mechanisms.** *Elife* 2014. 3: e02200.

Allen MA, Dowell RD. **Retrospective reflections of a whistleblower- Opinions on misconduct responses.** *Accountability in Research* 2013. 20(5-6): 339-348.

Galbraith M, Allen M, Bensard L, Wang X, Schwinn M, Qin B, Long H, Daniels D, Hahn W, Dowell RD, Espinosa J. **HIF1A employs CDK8-Mediator to stimulate RNAPII elongation in response to hypoxia.** *Cell* 2013. 153: 1327-1339.

Grachtchouk M, Pero J, Yang S, Ermilov A, Michael LE, Wang A, Wilbert D, Patel R, Ferris J, Diener J, Allen M, Lim S, Syu L, Verhaegen M, Dlugosz AA. **Basal cell carcinomas in mice arise from hair follicle stem cells and multiple epithelial progenitor populations.** *Journal of Clinical Investigation* 2011. 121: 1768-1781.

Allen MA, Hillier L, Waterston RB, Blumenthal T. **A global analysis of *C. elegans* trans-splicing.** *Genome Research* 2011. 21(2): 255-264.

Lasda E.L., Allen MA, Blumenthal T. **Polycistronic pre-mRNA processing in vitro: snRNP and pre-mRNA role reversal in trans-splicing.** *Genes & Development* 2010. 24(15): 1645-1658.

Cui M, Allen MA*, Larsen A, Macmorris M, Han M, Blumenthal T.* **Genes involved in pre-mRNA 3'-end formation and transcription termination revealed by a lin-15 operon Muv suppressor screen.** *Proceedings of the National Academy of Sciences of the United States of America*, 2008. 105(43): 16665-16670. (*Contributed equally to this work.)

Vicens Q, Allen MA, Gilbert SD, Reznik B, Gooding AR, Batey RT. **The Cech Symposium: a celebration of 25 years of ribozymes, 10 years of TERT, and 60 years of Tom.** *RNA* 2008. 14(3): 397-403.

Allen M, Grachtchouk M, Sheng H, Grachtchouk V, Wang A, Wei L, Liu J, Ramirez A, Metzger D, Chambon P, Jorcano J, Dlugosz AA. **Hedgehog signaling regulates sebaceous gland development.** *The American Journal of Pathology* 2003. 163(6): 2173-2178.

Submitted Manuscripts

Cardiello JF, Westfall J, Dowell RD, Allen MA. Characterizing primary transcriptional responses to short-term heat shock in paired fraternal lymphoblastoid lines with and without Down syndrome. submitted

Hunter S, Hendrix J, Freeman J, Dowell RD, Allen MA. Transcriptional Dosage compensation does not occur in Down syndrome. submitted

Kurland JV, Deusen AV, Pawlikowski B, Hall M, Betta ND, Antwine T, Cutler AC, Russell A, Allen MA, Dowell R, Olwin B. Myonuclear maturation dynamics in aged and adult regenerating mouse skeletal muscle. reviewed, preparing response to reviewer comments

Patent

University of Colorado, Boulder, Colorado USA

R.D. Dowell, J. Azofeifa and M.A. Allen. Assessment of Transcription Factor Activity

Filed Feb 14th, 2018

PCT Application No. PCT/US2018/0182330

CU TTO File No. CU4226B-PCTI

Presentations

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| International Conference of the Trisomy 21 Research Society , Long Beach, California
Talk title: "What controls the Trisomy 21 response to perturbation? Robust short-term response to heat-shock in a Trisomy 21 cell" | 10-June-22 |
| 37th Annual MD/PhD Student Conference , Copper Mountain, Colorado. Talk title: "Surviving the ethical swamps of scientific research" | 10-July-22 |
| National Institute of Environmental Health Sciences Ethics series , via Zoom
title: <i>Before, During, and After I Learned My PI Falsified Data</i>
https://www.niehs.nih.gov/research/resources/bioethics/index.cfm | 18-April-21 |
| Research Reproducibility 2020: Educating for Reproducibility , via Zoom
Panelist: Student Experience & Support | 3-Dec-20 |
| 34nd Annual MD/PhD Student Conference , Keystone, Colorado. Talk title: "Surviving the ethical swamps of scientific research" | 14-July-19 |
| 33nd Annual MD/PhD Student Conference , Keystone, Colorado. Talk title: "Surviving the ethical swamps of scientific research" | 14-July-18 |
| 32nd Annual MD/PhD Student Conference , Keystone, Colorado. Talk title: "Surviving the ethical swamps of scientific research" | 16-July-17 |

National Data Integrity Conference , University of Colorado-Denver. Talk title: “A key to unlocking the function of non-coding variations in disease: data sharing nascent transcription reanalysis”	2-Jun-16
Interdisciplinary Quantitative Biology Student Symposium , University of Colorado-Boulder. Talk title: “The transcriptional landscape of trisomy 21”	10-Mar-15
WISE Science Communication Symposium , University of Colorado-Boulder. Talk title: “Who is typical? An individual with Down Syndrome”	21-Apr-16
Linda Crnic Annual Down Syndrome Symposium , University of Colorado-Denver. Talk title: “The transcriptional landscape of trisomy 21”	31-Oct-14
NLM Informatics Training Conference , University of Utah. Talk title: “The p53 Transcriptome” (plenary session)	18-Jun-13
ORI at 20: Reassessing Research Integrity-A Leadership Conference , Baltimore, MD. Talk title: “Challenges in protecting whistleblowers—A whistleblowers account of a case” (invited speaker)	5-Apr-13
10th Annual Rocky Mountain Bioinformatics Conference , Snowmass Village, Colorado. Talk title: “Rediscovery of the p53 transcriptome”	7-Dec-12
National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs Committee on Responsible Science , Washington, DC. Talk title: “Prevention, Protection, Progress” (invited speaker)	14-Aug-12
9th Annual Rocky Mountain Bioinformatics Conference , Snowmass Village, Colorado. Talk title: “Rediscovery of the p53 transcriptome”	9-Dec-11
16th International C. elegans Meeting , University of California – Los Angeles. Talk title: “Analysis of transcription of the entire genome on tiling microarrays” (plenary session)	28-Jun-08
Ethics panel , University of Illinois at Urbana – Champaign. Panel title: “Truth and consequences: What happened when a group of University of Wisconsin students learned their advisor faked data”	8-Dec-06
2004 Midwest Worm Meeting , Kansas University. Talk title: “Sex determination gene <i>laf-1</i> is a processed non-coding RNA”	12-Jul-04

Teaching Experience

Data Science for Diverse Scholars in Down Syndrome Research (DS3) , Two-week workshop on omics research in Down syndrome. University of Colorado-Boulder	2022-present
RCR (Responsible Conduct of Research) undergraduate forum , One-day workshop designed to meet NIH RCR requirements and teach hands-on RCR skills to undergraduates currently working in research labs	2022-present

CCARS (Crash Course Advanced Rcr for Senior graduate students and post-docs) Two-day workshop designed to meet NIH RCR requirements and improve rigor and reproducibility. University of Colorado-Boulder	2018-present
GRAD5000, Responsible Conduct of Research , Semester-long graduate level course on ethical research. University of Colorado-Boulder	2018-present
Guest Lectures in various classes (CBP 7711 Methods and Tools in Biomedical Informatics , CSCI 5352 Biological Networks, MCDB 3450 Biological Data Science , IPHY 5900 Data Literacy in Biomedical Research) University of Colorado-Boulder and University of Colorado-Anschutz	2017-present
Workshop Instructor for Short Read Sequence Analysis - University of Colorado-Boulder. Taught the lectures that focused on both the overall concepts involved in short read sequencing and RNA-seq	2014-2015, 2017-2019, 2021-2022
Research Mentor - University of Colorado-Boulder. Introduced many graduate students (>20) and undergraduates (>10) to scientific research	2007-present
Physics Instructor - The DaVinci Institute. (charter high school - Jackson, MI) Taught Advanced Physics	1999
Teaching Assistant - Spring Arbor University. Assisted instruction of laboratory for General Chemistry and Organic Chemistry I and II	1997-1999

Leadership

Crnac Boulder Branch Assistant Director, BioFrontiers CU-Boulder (2022-present). The Crnic Boulder Branch, affiliated with the Linda Crnic Institute for Down Syndrome, is the BioFrontiers Institute-based strategy to leverage and potentiate the Down syndrome research community in Boulder, CO. We focus on interdisciplinary research and data science education aimed at understanding Trisomy 21 phenotypes.

Organized the Fifteen-five faculty accountability group, a National online faculty group (2022-2023). Created an online accountability group for faculty. Faculty participate in a weekly self-assessment of productivity and every other month assessments of big goals and obstacles which prevent us from meeting our goals.

Organized a Down syndrome Journal club, BioFrontiers CU-Boulder (2014-2020). I started this group to create connections between the Down syndrome research community on the Boulder campus and to improve our knowledge of Down syndrome-related literature. We meet once or twice a month to discuss the current Down syndrome-related publications.

Developed/Organized a two-week Workshop on Short Read Sequencing Analysis, BioFrontiers CU-Boulder (2014-2015, 2017-2019, 2021-present). I outlined each topic, then recruited Dowell Lab members to teach subsections. The class is taught in the reverse classroom, so I produced and edited videos. Also, undertook advertising and communication with students. Finally, I've had lectures that focused on short-read sequencing analysis steps.

Organized a Post-doctoral Writing Group, BioFrontiers CU-Boulder (2011-2014). I started this group to improve my post-doctoral writing skills. We meet twice a month to discuss and edit the publication and grant drafts of each member.

Chair of the Graduate Student Symposium Committee, MCDB CU-Boulder (2007- 2008). I led a committee of four students organizing the biennial graduate student symposium. We chose and invited speakers. We developed and prepared all necessities for the symposium on Oct. 24-25th, 2008.

Faculty Representative for Graduate Students, MCDB CU-Boulder (2007- 2008). Fellow students chose me to represent MCDB graduate students at the monthly faculty meetings. I polled the opinions of the graduate students in the department about ideas presented by the faculty and reported student responses back to the faculty.

Service

IQ Biology student admissions, BioFrontiers, CU-Boulder (2022-present). Review and discuss student applications for the Interdisciplinary Quantitative (IQ) Biology Graduate Certificate program through CU Boulder's BioFrontiers Institute. This graduate program seeks to educate graduate students that are interested in more than one scientific discipline/department.

Member of Biophysics and SCR T32 faculty, BioFrontiers, CU-Boulder (2023-current). Participated T32 related meetings and training sessions.

Member of BioFrontiers Compute Committee, BioFrontiers, CU-Boulder (2018-current). Participated in a workgroup with the goal of optimizing the use of the BioFrontiers supercomputer.

Member of the University of Colorado Values and Ethics Committee, CU-Boulder (2018-2020). Participated in a workgroup with the goal of increasing integrity on the CU Boulder campus. We also reviewed the current state of ethics-related policies on campus.

Research Experience

Sie Research Faculty Fellow - University of Colorado Boulder. Exploring the molecular basis of expression dysregulation in Down syndrome.	2017-present
Sie Post-doctoral Fellow - University of Colorado Boulder. Principal Investigator: Robin Dowell, D.Sc. Genetically encoded suppressors of the deleterious Down syndrome phenotypes.	2014-2017
Post-doctoral Research Assistant - University of Colorado Boulder. Principal Investigators: Robin Dowell, D.Sc. and Joaquin Espinosa, Ph.D. Determined global p53 effects on transcription.	2010-2014
Graduate Research Assistant - University of Colorado Boulder. Principal Investigator: Tom Blumenthal, Ph.D. Investigated 3' end formation of Pol II-transcribed genes and global trans-splicing regulation.	2006-2010

Graduate Research Assistant - University of Wisconsin Madison. Principal Investigator: Elizabeth Goodwin, Ph.D. Studied the functions of the <i>laf-1</i> sex determination gene.	2002-2006
Research Technician - University of Michigan Ann Arbor. Principal Investigator: Andrzej Dlugosz, M.D., Ph.D. Researched the effects of Hedgehog signaling in sebaceous gland formation.	2000-2002
Lab Assistant - Spring Arbor University. Supervisors: David Johnson, Ph.D. and Michael Buratovich, Ph.D. Prepared chemicals, equipment, and cultures.	1999-2000

Faculty Training

Scientific Communication Advances Research Excellence (SCOARE)	2022
Compass Leadership and Management training program	2022
IQ Train the trainer workshop	2022
Raising a Resilient Scientist	2022-2023
Inclusive Research Mentoring	2023-present

Referee

***Grants**

NSF	2023
ABnexus	2023
Israel Science Foundation	2022
ABnexus	2022
National Institute of Health	2021
US Department of Health and Human Services Office of Research Integrity	2020
Crnic Institute	2018

***Journals**

open biology	2023
eLife	2022
Genome Biology	2021
ISMB	2020
Plos Biology	2019
JMB	2019
Nature	2018
Genetics	2018

Professional Memberships

Trisomy 21 Research Society membership

2021-present