Adelaide Tovar, Ph.D.

Postdoctoral Fellow
University of Michigan Medical School
tovar@umich.edu · adelaidetovar.com · *Updated:* Apr. 20, 2025

Education

The University of North Carolina at Chapel Hill Chapel Hill, NC
Ph.D. Genetics & Molecular Biology Aug. 2015-Feb. 2021
Advisor: Dr. Samir Kelada
Dissertation: "Dissecting respiratory responses to ozone exposure with genetics and genomics"

Massachusetts Institute of Technology Cambridge, MA
S.B. Course 7 - Biology Sept. 2011-June 2015
Advisors: Drs. Darrell Irvine and Gregory Szeto
Thesis: "Developing an improved immunotherapy for late-stage cancers by engineered immunomodulation"

Research Experience

University of Michigan, Dept. of Computational Medicine & Bioinformatics
Postdoctoral Fellow, Parker and Kitzman Labs Apr. 2021-present

- Leading a cross-institutional initiative to design and implement of a collection of massively parallel reporter assays (MPRA) to screen metabolic disease-associated genetic variants
- Using integrative computational approaches to analyze existing MPRA and genomic datasets to identify sequence determinants of regulatory element activity
- Developing novel tools to study *cis* and *trans* effects on gene regulation

The University of North Carolina at Chapel Hill, Dept. of Genetics
Graduate Research Assistant, Kelada Lab Aug. 2015-Mar. 2021

- Designed and executed a large mouse screen (56 strains) to carry out QTL mapping and other statistical genetics approaches to identify genes and pathways associated with susceptibility to adverse effects of ozone exposure
- Performed *in vitro* and *in vivo* studies to investigate inflammatory, epigenomic, and transcriptional responses to ozone exposure in airway macrophages
- Established and refined existing bioinformatic/computational pipelines for microarray, Nanostring, RNA-seq, ATAC-seq, and quantitative genetics analyses

Massachusetts Institute of Technology, Dept. of Biological Engineering
Undergraduate Research Assistant, Irvine Lab Aug. 2013-June 2015

- Formulated and tested a novel biocompatible microparticle for delivery of small molecules for individual and combinatorial cancer immunotherapy

University of North Texas, Dept. of Biological Sciences
Summer Researcher, Padilla Lab June 2013-Aug. 2013

- Designed and performed an EMS mutagenesis screen in *C. elegans* to identify gene-by-diet interactions involved in responses to hypoxia and anoxia

Preprints and Publications

*(*contributed equally)*

1. K Nishino, JO Kitzman, SCJ Parker, **A Tovar**. Functional dissection of metabolic trait-associated gene regulation in steady state and stimulated human skeletal muscle cells. *bioRxiv*. 2024 Nov; 625886.

2. A Varshney, N Manickam, P Orchard, **A Tovar**, Z Zhang, F Feng, MR Erdos, N Narisu, C Ventresca, K Nishino, V Rai, HM Stringham, AU Jackson, T Tamsen, C Gao, OI Koues, JD Welch, CF Burant, LK Williams, C Jenkinson, RA DeFronzo, L Norton, J Saramies, TA Lakka, M Laakso, J Tuomilehto, KL Mohlke, JO Kitzman, HA Koistinen, J Liu, M Boehnke, FS Collins, LJ Scott, SCJ Parker. Population-scale skeletal muscle single-nucleus multi-omic profiling reveals extensive context specific genetic regulation. *bioRxiv*. 2023 Dec; 571696. *In revision at Nature Genetics.*

3. **A Tovar**, Y Kyono, K Nishino, M Bose, A Varshney, SCJ Parker, JO Kitzman. Using a modular massively parallel reporter assay to discover context-specific regulatory grammars in type 2 diabetes. *bioRxiv*. 2023 Oct; 561391. *In revision at Genome Research*

4. **A Tovar**, GJ Smith, JM Thomas, KM McFadden, SNP Kelada. A locus on chromosome 15 contributes to acute ozone-induced lung injury in Collaborative Cross mice. *Am J Respir Cell Mol Biol*. 2022 Nov;67(5):528-538.

5. **A Tovar***, WL Crouse*, GJ Smith, JM Thomas, BP Keith, KM McFadden, TP Moran, TS Furey, SNP Kelada. Integrative phenotypic and genomic analyses reveal strain-dependent responses to acute ozone exposure and their associations with airway macrophage transcriptional activity. *Am J Physiol Lung Cell Mol Physiol*. 2022 Jan 1;322(1):L33-L49.

6. GJ Smith, **A Tovar**, KM McFadden, TP Moran, JG Wagner, JR Harkema, SNP Kelada. A Murine Model of Ozone-Induced Non-atopic Asthma from the Collaborative Cross. *Am J Respir Cell Mol Biol*. 2021 Dec;65(6):672-674.

7. GJ Smith, **A Tovar**, M Kanke, Y Wang, JS Deshane, P Sethupathy, SNP Kelada. Ozone-induced changes in the murine lung extracellular vesicle small RNA landscape. *Physiol Rep*. 2021 Sep;9(18):e15054.

8. LT Laudermilk, **A Tovar**, AK Homstad, JM Thomas, KM McFadden, MK Tune, DO Cowley, JR Mock, F Ideraabdullah, SNP Kelada. Baseline and innate immune response characterization of a Zfp30 knockout mouse strain. *Mamm Genome*. 2020 Aug;31(7-8):205-214.

9. **A Tovar***, GJ Smith*, JM Thomas, WL Crouse, J Harkema, SNP Kelada. Transcriptional profiling of the murine airway response to acute ozone exposure. *Toxicol Sci*. 2020 Jan 1;173(1):114-130.

10. M Weiser, JM Simon, B Kochar, **A Tovar**, JW Israel, A Robinson, GR Gipson, MS Schaner, HH Herfarth, RB Sartor, DPB McGovern, R Rahbar, TS Sadiq, MJ Koruda, TS Furey, SZ Sheikh. Molecular classification of Crohn's disease reveals two clinically relevant subtypes. *Gut*. 2018 Jan;67(1):36-42.

Funding

MOSAIC Postdoctoral Career Transition Award (K99/R00), NHGRI — Sept. 2024-Aug. 2029
K99HG013676

Postdoctoral Diversity Enrichment Program, Burroughs Wellcome Fund — Sept. 2022-Aug. 2025

REACH Loan Repayment Program, NIDDK — Aug. 2022-July 2024
L70DK134031

Opportunity Pool Funding, Accelerating Medicines Partnership Program for Common Metabolic Diseases — May 2022-Apr. 2024
MPI with Jacob Kitzman and Steve Parker

UROP Supplemental Funding, University of Michigan — Feb., Sept. 2023

Postdoctoral Training Program in Basic Diabetes Research, Department of Internal Medicine, University of Michigan Medical School — Sept. 2021-Aug. 2023
Administered by T32DK101357

Dissertation Completion Fellowship, The Graduate School, The University of North Carolina at Chapel Hill — Aug. 2020-May 2021

Graduate Student Travel Scholarship, International Mammalian Genome Society

- Washington, D.C. (funds returned, conference held virtually) — Apr. 2020
- Strasbourg, France — Sept. 2019
- Río Grande, Puerto Rico — Nov. 2018

Transportation Grant, UNC Graduate School — Feb. 2019

Research Supplement to Promote Diversity in Health-Related Research, National Institute of Environmental Health Sciences (NIEHS) — Oct. 2016-Oct. 2019
Administered under parent grant R01ES024965 awarded to Kelada

Selected Presentations

Invited

1. "Exploring regulatory convergence in rare and common diabetes with massively parallel reporter assays," American Diabetes Association 84th Scientific Sessions, Orlando, FL, June 2024

Oral

1. "Assessing cellular contexts of type 2 diabetes-associated variants at scale," Accelerating Medicines Partnership for Common Metabolic Diseases Parliament Meeting, Philadelphia, PA, April 2025
2. "Assessing cellular contexts of type 2 diabetes-associated variants at scale," American Society of Human Genetics Annual Meeting, Denver, CO, November 2024
3. "Using massively parallel reporter assays to discover context-specific regulatory grammars," Human Genetics and Genomics Gordon Research Seminar, Waterville Valley, NH, July 2023
4. "A modular massively parallel reporter assay uncovers context-specific activity of diabetes-associated regulatory elements," American Diabetes Association 82nd Scientific Sessions, New Orleans, LA, June 2022
5. "A modular massively parallel reporter assay uncovers context-specific allelic activity of GWAS variants," American Society of Human Genetics Annual Meeting, virtual, Sept. 2021
6. "Gene-environment interactions underlie respiratory responses to the air pollutant ozone," Genetics Society of America Science in a Snapshot Seminar Series, virtual, June 2020
7. "A GxE QTL on Chr. 15 underlies susceptibility to air pollution-induced lung injury in mice," The Allied Genetics Conference, virtual, Apr. 2020

8. "Investigating susceptibility to ozone-induced lung inflammation and injury using the Collaborative Cross genetic reference population," American Thoracic Society International Conference, Dallas, TX, May 2019

Poster

1. "Enhancer-promoter compatibility and cellular context in disease-associated gene regulation," American Society of Human Genetics Annual Meeting, Washington, DC, Nov. 2023
2. "Using massively parallel reporter assays to dissect context-specific regulatory grammars in type 2 diabetes," American Society of Human Genetics Annual Meeting, Los Angeles, CA, Oct. 2022
3. "A GxE QTL on Chr. 15 underlies susceptibility to air pollution-induced lung injury in mice," The Allied Genetics Conference, Virtual, Apr. 2020
4. "Identification of genetic loci associated with susceptibility to lung injury caused by the air pollutant ozone," International Mammalian Genome Conference, Strasbourg, France, Sept. 2019
5. "Dynamics of alveolar macrophage transcriptional regulation following sterile inflammation," Systems Immunology, Cold Spring Harbor Laboratory, Mar. 2019

Awards and Honors

Postdoctoral Leadership Academy, SACNAS — Oct. 2023

Rising Star in Genetics and Genomics, University of Utah Dept. of Human Genetics — May 2023

GENETICS Peer Review Training Program, GSA — Jan. 2023-Dec. 2023

Human Genetics Scholar, American Society for Human Genetics — Aug. 2022-July 2024

Outstanding Poster Presentation Award, — Sept. 2019, Apr. 2020
International Mammalian Genome Society

Fellow, Yale Ciencia Academy for Career Development — Jan.-Dec. 2020

First Place, Poster Presentation Award, — Oct. 2019
Initiative for Maximizing Student Development

Minority Trainee Development Scholarship, American Thoracic Society — May 2019

S. Klein Prize in Technical Writing, MIT Comparative Media Studies/Writing — May 2015
For undergraduate thesis

Award Winner, Wellcome Image Awards, Wellcome Trust — Mar. 2015
Received with Gregory Szeto and Jeffrey Wyckoff

Winner, KI Image Awards, Koch Institute for Integrative Cancer Research — Mar. 2015
Received with Gregory Szeto and Jeffrey Wyckoff

Mentorship

Graduate Research Mentor

1. Lovelyn Epelle, Parker lab graduate student — Jan. 2024-current
2. Ben Li, Parker lab graduate student — Feb. 2023-current
3. Maya Bose, Parker lab graduate student — Nov. 2021-Dec. 2021, Mar. 2022-current
4. Elysia Chou, Parker lab rotation student — Jan. 2022-Mar. 2022

5. Morgan Nalesnik, Kelada lab rotation/graduate student — Feb. 2020-Mar. 2021
6. Syed Masood, Kelada lab rotation student — Aug.-Nov. 2018

Undergraduate Research Mentor

1. Miranda Jefferds, U-M undergraduate — Sept. 2023-current
2. Ellie Bloss, U-M undergraduate — Sept. 2023-current
3. Hailey McMillen, U-M undergraduate — Oct. 2022-current
4. Kirsten Nishino, U-M undergraduate — June 2022-current
5. Sanjana Yandav, U-M undergraduate — Sept. 2023-May 2024
6. Ronak Arun, U-M undergraduate — Jan. 2023-May 2023
7. Elli Gasper, U-M undergraduate — Oct. 2022-May 2023
8. Daniel Vargas, UNC undergraduate — Aug. 2018-May 2020
9. Jessica Bustamante, UNC undergraduate — Aug. 2018-May 2019
10. Abbott Ndukwe, UNC undergraduate — Sept. 2017-May 2018

Teaching Experience and Training

University of Michigan
Postdoctoral Short Course on College Teaching in STEM — Jan.-Apr. 2023

The University of North Carolina at Chapel Hill
Academic Coach — Aug. 2017-May 2020

- GNET 621: Introduction to Genetic Analysis, GNET 632: Advanced Molecular Biology, BCB 720: Advanced Statistical Modeling

Teaching Assistant, GNET 632: Advanced Molecular Biology — Jan.-May 2017

Massachusetts Institute of Technology
Tutor, Department of Biology — Aug. 2014-May 2015

AP Biology Instructor, Educational Studies Program — Aug. 2013-May 2014

Professional Memberships

- American Diabetes Association — Apr. 2022-present
- American Society of Human Genetics — Mar. 2021-present
- Genetics Society of America — July 2019-present
- International Mammalian Genome Society — June 2017-present
- Society for the Advancement of Chicanos and Native Americans in Science — Aug. 2016-present

University and Professional Service

Chair, "Type 2 diabetes and related trait GWAS variant effects through omics profiles," ADA 84th Scientific Sessions — June 22, 2024

Moderator, "Walking the dogma: Proteomics to inform genomic studies," ASHG Annual Meeting — Nov. 3, 2023

Abstract Reviewer, ADA — 2023, 2024

Moderator, "The current environment for gene-environment interactions," ASHG Annual Meeting — Oct. 27, 2022

Abstract Reviewer, ABRCMS — Sept. 2022

Abstract Reviewer, ASHG — June 2022

Research Application Reviewer, SACNAS — 2021, 2022, 2023

Co-chair, MPRA Working Group, AMP-CMD Consortium — Jan. 2022-present

Application Reviewer, Intersections Science Fellows Symposium — Sept. 2021

Chair, UNC Academic and Research Intensive Careers (ARIC) Cohort — July 2019-Aug. 2020

Family Leader, UNC Department of Genetics Network (GeNe) — May 2019-May 2020

Advisor, UNC University Career Services Pre-Graduate Educational Advising Program (PGEAP) — Aug. 2018-May 2020

Peer Mentor, UNC BBSP First-Year Group — Aug. 2018-May 2020

Member, PGEAP Recruitment & Training Committee — May 2019-Aug. 2019

Poster Judge, UNC Summer Undergraduate Pipeline Research Symposium — July 2019

Panelist, UNC Chancellor's Science Scholars STEM Grad School Discussion — July 2019

Member, UNC ARIC Cohort Planning Committee — Aug.-Dec. 2018

Outreach

Co-Chair, Education & DEI, Michigan DNA Day — Aug. 2021-July 2022

Educational Counselor, MIT Admissions — Aug. 2015-May 2020

Teacher, DNA Day CONNECT — Aug. 2017-May 2018

Ambassador, North Carolina DNA Day — Apr. 2016, Apr. 2017, Apr. 2018

Volunteer, Cambridge Science Festival — Apr. 2015