

# Adelaide Tovar, Ph.D.

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## Education

### The University of North Carolina at Chapel Hill

*Ph.D. Genetics & Molecular Biology*

Advisor: Dr. Samir Kelada

Dissertation: "Dissecting respiratory responses to ozone exposure with genetics and genomics"

Chapel Hill, NC

Aug. 2015-Feb. 2021

### Massachusetts Institute of Technology

*S.B. Course 7 - Biology*

Advisors: Drs. Darrell Irvine and Gregory Szeto

Thesis: "Developing an improved immunotherapy for late-stage cancers by engineered immunomodulation"

Cambridge, MA

Sept. 2011-June 2015

## 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 (>500 animals) 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, Nano-string, 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 a novel biocompatible microparticle for delivery of small molecules for individual and combinatorial cancer immunotherapy
- Examined the role of the aryl hydrocarbon receptor and the tryptophan catabolic pathway in innate and adaptive immune responses

### University of North Texas, Dept. of Biological Sciences

*Summer Researcher, Padilla Lab*

June 2013-Aug. 2013

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

## Preprints

(\*contributed equally)

1. 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.
2. **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.

## Publications

3. **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.
4. **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.
5. 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.
6. 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.
7. LT Lauder milk, **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.
8. **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. \*contributed equally
9. 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

<b>MOSAIC Postdoctoral Career Transition Award (K99/R00)</b> , NHGRI <i>K99HG013676</i>	Sept. 2024-Aug. 2029
<b>UROP Supplemental Funding</b> , University of Michigan	Sept. 2023
<b>UROP Supplemental Funding</b> , University of Michigan	Feb. 2023
<b>Postdoctoral Diversity Enrichment Program</b> , Burroughs Wellcome Fund	Sept. 2022-Aug. 2025
<b>REACH Loan Repayment Program</b> , NIDDK <i>L70DK134031</i>	Aug. 2022-July 2024
<b>Opportunity Pool Funding</b> , Accelerating Medicines Partnership Program for Common Metabolic Diseases <i>MPI with Jacob Kitzman and Steve Parker</i>	May 2022-Apr. 2024

- Postdoctoral Training Program in Basic Diabetes Research,** Sept. 2021-Aug. 2023  
 Department of Internal Medicine, University of Michigan Medical School  
*Administered by T32DK101357*
- Dissertation Completion Fellowship,** The Graduate School, Aug. 2020-May 2021  
 The University of North Carolina at Chapel Hill
- 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,** Oct. 2016-Oct. 2019  
 National Institute of Environmental Health Sciences (NIEHS)  
*Administered under parent grant R01ES024965*

## 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," American Society of Human Genetics Annual Meeting, Denver, CO, November 2024
2. "Using massively parallel reporter assays to discover context-specific regulatory grammars," Human Genetics and Genomics Gordon Research Seminar, Waterville Valley, NH, July 2023
3. "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
4. "A modular massively parallel reporter assay uncovers context-specific allelic activity of GWAS variants," American Society of Human Genetics Annual Meeting, virtual, Sept. 2021
5. "Gene-environment interactions underlie respiratory responses to the air pollutant ozone," Genetics Society of America Science in a Snapshot Seminar Series, virtual, June 2020
6. "A GxE QTL on Chr. 15 underlies susceptibility to air pollution-induced lung injury in mice," The Allied Genetics Conference, virtual, Apr. 2020
7. "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

<b>Postdoctoral Leadership Academy, SACNAS</b>	Oct. 2023
<b>Rising Star in Genetics and Genomics, University of Utah Dept. of Human Genetics</b>	May 2023
<b>GENETICS Peer Review Training Program, GSA</b>	Jan. 2023-Dec. 2023
<b>Human Genetics Scholar, American Society for Human Genetics</b>	Aug. 2022-July 2024
<b>Outstanding Poster Presentation Award, International Mammalian Genome Society</b>	Sept. 2019, Apr. 2020
<b>Fellow, Yale Ciencia Academy for Career Development</b>	Jan.-Dec. 2020
<b>First Place, Poster Presentation Award, Initiative for Maximizing Student Development</b>	Oct. 2019
<b>Minority Trainee Development Scholarship, American Thoracic Society</b>	May 2019
<b>S. Klein Prize in Technical Writing, MIT Comparative Media Studies/Writing For undergraduate thesis</b>	May 2015
<b>Award Winner, Wellcome Image Awards, Wellcome Trust</b> <i>Received with Gregory Szeto and Jeffrey Wyckoff</i>	Mar. 2015
<b>Winner, KI Image Awards, Koch Institute for Integrative Cancer Research</b> <i>Received with Gregory Szeto and Jeffrey Wyckoff</i>	Mar. 2015

## Mentorship

1. Miranda Jefferds, Parker/Kitzman lab undergraduate	Sept. 2023-current
2. Ellie Bloss, Parker/Kitzman lab undergraduate	Sept. 2023-current
3. Sanjana Yandav, Parker/Kitzman lab undergraduate	Sept. 2023-current
4. Ben Li, Parker lab graduate student	Feb. 2023-current
5. Hailey McMillen, Parker/Kitzman lab undergraduate	Oct. 2022-current
6. Kirsten Nishino, Parker/Kitzman lab undergraduate	June 2022-current
7. Maya Bose, Parker lab graduate student	Nov. 2021-Dec. 2021, Mar. 2022-current
8. Ronak Arun, Parker/Kitzman lab undergraduate	Jan. 2023-May 2023
9. Elli Gasper, Parker/Kitzman lab undergraduate	Oct. 2022-May 2023
10. Elysia Chou, Parker lab rotation student	Jan. 2022-Mar. 2022
11. Morgan Nalesnik, Kelada lab rotation/graduate student <i>Currently: Graduate student in Jaspers lab, UNC</i>	Feb. 2020-Mar. 2021
12. Daniel Vargas, UNC undergraduate <i>Currently: Laboratory manager in Kelada lab, UNC</i>	Aug. 2018-May 2020
13. Jessica Bustamante, UNC undergraduate <i>Currently: Graduate student, Sarah Lawrence College</i>	Aug. 2018-May 2019
14. Syed Masood, Kelada lab rotation student <i>Currently: Graduate student in Samet lab, UNC</i>	Aug.-Nov. 2018
15. Abbott Ndukwe, UNC undergraduate <i>Currently: Project manager at Cisco</i>	Sept. 2017-May 2018

## Teaching Experience

### 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

*Abstract Reviewer*, ADA Jan. 2024

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

*Research Application Reviewer*, SACNAS Apr. 2023-Aug. 2023

*Abstract Reviewer*, ADA Jan. 2023

*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 Apr. 2022-Aug. 2022

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

*Application Reviewer*, Intersections Science Fellows Symposium Sept. 2021

*Research Application Reviewer*, SACNAS Apr. 2021-Aug. 2021

*Member*, UNC Department of Genetics URM Postdoc-to-Faculty Recruitment Committee Sept. 2019-Dec. 2020

*Panelist*, UNC IMSD Bootcamp Discussions, Aug. 2020

*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

*Poster Judge*, UNC BBSP/PREP Research Symposium Nov. 2019

*Poster Judge*, International Mammalian Genome Conference Sept. 2019

<i>Panelist, UNC IMSD Bootcamp Discussions, Aug. 2019</i>	
<i>Member, PGEAP Recruitment &amp; Training Committee</i>	May 2019-Aug. 2019
<i>Poster Judge, UNC Summer Undergraduate Pipeline Research Symposium</i>	July 2019
<i>Panelist, UNC Chancellor's Science Scholars STEM Grad School Discussion</i>	July 2019
<i>Member, UNC ARIC Cohort Planning Committee</i>	Aug.-Dec. 2018

**Outreach**

<i>Co-Chair, Education &amp; DEI, Michigan DNA Day</i>	Aug. 2021-July 2022
<i>Educational Counselor, MIT Admissions</i>	Aug. 2015-May 2020
<i>Teacher, DNA Day CONNECT</i>	Aug. 2017-May 2018
<i>Ambassador, North Carolina DNA Day</i>	Apr. 2016, Apr. 2017, Apr. 2018
<i>Volunteer, Cambridge Science Festival</i>	Apr. 2015