

Robel Alemu

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EDUCATION

Ph.D. in Computational Methods (Econometrics) Tufts University, Medford, MA, USA Dissertation: “Modifiable risk exposures, physical health, and cognitive performance”	2017 – 22
M.Sc. in Biotechnology Addis Ababa University, Addis Ababa, Ethiopia Thesis: “Molecular characterization of milk protein genes using sequencing and RFLP markers”	2008 – 10
B.Sc. in Biology Haramaya University, Dire Dawa, Ethiopia	2002 – 05

RESEARCH EXPERIENCE

Postdoctoral Scholar University of California Los Angeles (UCLA) Social Science Genetics Association Consortium (SSGAC) Lab: Prof. Daniel J. Benjamin	2022 – Present
Visiting Research Fellow Broad Institute of MIT and Harvard – Cambridge, MA Program in Medical and Population Genetics Lab: Prof. Benjamin Neale	2022 – Present
Research Assistant University of Wisconsin – Madison, WI	2019 – 2022
Research Assistant Tufts University – Boston, MA	2016 – 2021
Project Lead Ethiopian ATA – Addis Ababa, Ethiopia	2011 – 2015

PEER-REVIEWED PUBLICATIONS

- **Alemu R**, Masters WA, Finaret AB. Sibling rivalry between twins in utero and childhood: Evidence from birthweight and survival of 95 919 twin pairs in 72 low-and middle-income countries. *American Journal of Human Biology*. 2023 Mar 2:e23887.
- **Alemu R**. The race towards more sustainable food systems. *Nature Food*. 2022 Sep;3(9):679-80.
- **Alemu R**, Gelaw AM, Gashu D, Tafere K, Mossa AW, Bailey EH, Masters WA, Broadley MR, Lark RM. Sub-sampling a large physical soil archive for additional analyses to support spatial mapping: a pre-registered experiment in Ethiopia. *Geoderma*. 2022 Oct 15;424:116013.
- Bai Y, **Alemu R**, Block SA, Headey D, Masters WA. Cost and affordability of nutritious diets at retail prices: evidence from 177 countries. *Food policy*. 2021 Feb 1;99:101983.
- Masters WA, Rosenblum NZ, **Alemu R**. Agricultural transformation, nutrition transition and food policy in Africa: Preston curves reveal new stylized facts. *Transformation of Rural Africa* 2020 Apr 28.

WORKING PAPERS

Alemu R, Turley P, Okbay A, Benjamin D. Examining the relative predictive performance of polygenic indexes (PGIs) across diverse ancestral populations. 2023.

Improvement in the predictive power of polygenic indices (PGI, also called PRS) is unbalanced across ancestral groups due to the over-representation of European ancestry individuals in most Genome-wide Association Studies (GWASs). The predictive accuracy of PGI falls by an average of ~37, ~50, and ~78 percent in individuals of South-Asian, East-Asian, and African ancestries, respectively. However, most prior studies focus on a few biological phenotypes, such as blood pressure and hemoglobin levels. This paper examines the loss of predictive accuracy in behavioral traits such as educational attainment, substance use, and neuropsychiatric conditions. Our preliminary results show PGI relative accuracy for educational attainment (EA) in African ancestry individuals in the HRS and Add-health cohorts are ~ 11 and 15 percent, respectively. Moreover, we find that the share of predictive accuracy shrinkage attributable to MAF and LD is ~ 65 percent, implying that the remaining loss is likely due to environmental factors or an imperfect cross-population correlation of causal SNPs. Quantifying the relative contribution of these factors may have behavioral, clinical, and policy implications.

Alemu R, Schmitz L. Exposure to higher cigarette taxes during adolescence moderates genetic risk for lifetime smoking behavior. 2023.

Studies on smoking initiation and cessation have recognized the importance of youth smoking on continued smoking in adulthood and have found that differences in statewide cigarette taxation affect the prevalence and intensity of cigarette consumption. This study coupled historical data on state-level cigarette excise taxes with polygenic indices (PGIs) for smoking behavior to assess whether genetically driven changes in lifetime smoking behavior varied by the timing of cigarette tax exposures. Using data from the U.S. Health and Retirement Study, we find that higher cigarette taxes in adolescence were more likely to reduce the probability of lifetime smoking in individuals with higher PGIs for smoking behavior and addiction than cigarette taxes in adulthood. These findings suggest that diminishing price responsiveness to cigarette taxes in the population at large may be temporary as newer generations of high-risk smokers are exposed to progressively higher taxation rates in their youth. Furthermore, we find suggestive evidence that smoking intensity is more sensitive to current taxes, whereas that experienced at younger ages may be more foundational in shaping the probability of lifetime smoking. Overall, the gene-environment interplay that we detect in the present study is consistent with the predictions of the rational addiction model. These findings suggest that prior studies that ignore the timing of cigarette tax exposure and potential gene-environment interaction may have underestimated the true effect of cigarette taxes in encouraging smoking cessation and reducing the risk of developing smoking-related illnesses.

TEACHING EXPERIENCE

Teaching Assistant

2020 – 2022

Tufts University – Friedman School of Nutrition Science and Policy
Courses Taught: Advanced Statistics, Statistical Methods

Teaching Assistant

2006 – 07

Haramaya University – Dire Dawa, Ethiopia
Course Taught: Principles of Genetics (undergraduate level)

GRANTS, AWARDS, AND FELLOWSHIPS

IMMANA Research Grant [\$28,000]

2020 – 2022

World Bank Development Support Grant [\$30,000]	2020 – 2022
AAEA Quality of Communication Award	2022
Neubauer Graduate Student Fellowship, Tufts University	2017 – 2022
Graduate Student Scholarship, Tufts University	2015 – 2016
Graduate Research Completion, Tufts University [\$1,000]	2020
Summer Research Grant, Tufts University [\$2,000]	2020

SEMINARS AND CONFERENCES (SELECTED)

Frontiers in Economic Analysis with Genetic Data Conference [Link]	2021
Western Economic Association International (WEAI) Student Workshop	2021
Integrating Genetics and Social Science (IGSS) Conference	2020
Tufts University Graduate Student Summer Speaker Series (GS4) [Video]	2020
International Food Policy Research Institute (IFPRI), Policy Seminar [Video]	2019
American Economic Association (AEA), Invited Session on Food Markets	2019

AD HOC REFEREE SERVICES

Nature, Food Policy, Journal of African Economies, Journal of Agricultural and Food Economics

SHORT-TERM TRAINING

Statistical Genetics: Applied Microbiome Analyses, University of Colorado	2022
Russell Sage Foundation Summer Institute in Social-Science Genomics	2021
Genomics for Social Scientists (GeSS), University of Michigan	2020
Genome-wide Data Analysis, Vrije Universiteit	2020

PROFESSIONAL MEMBERSHIPS

American Society of Human Genetics (ASHG), American Economic Association (AEA), American Society of Health Economists (ASHEcon), American Society for Nutrition (ASN)

STATISTICAL SOFTWARE AND LANGUAGES

Software	R, STATA, Python, MATLAB, SAS, ArcGIS, Latex, Linux
Languages	English (Fluent), Amharic (Native)

REFERENCES

Professor Daniel J. Benjamin (Ph.D.)
 Behavioral Decision-Making Group, UCLA Anderson School of Management
 Human Genetics Department, UCLA David Geffen School of Medicine
danielbenjamin@ucla.edu, 310-825-4461

Professor Lauren L. Schmitz (Ph.D.)
 La Follette School of Public Affairs, A
llschmitz@wisc.edu, 608-265-3233

Professor William A. Masters (Ph.D.)
 Friedman School of Nutrition Science and Policy, Tufts University
william.masters@tufts.edu, 617-636-3751