ZAKARI LOWENTHAL BILLO

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EDUCATION

Columbia University Mailman School of Public Health - New York, NY
Master of Public Health, Department of Epidemiology — May 2026
Applied Biostatistics and Public Health Data Science

The University of North Carolina at Chapel Hill - Chapel Hill, NC
Bachelor of Science, Chemistry, Cum Laude — May 2024

RESEARCH EXPERIENCE

Columbia University Department of Biostatistics – New York, NY
Thesis – *Inferring the Causal Determinants of "Inflamm-aging" with Graphical Learning* Sept 2025 – Present
Tow Doctoral Scholar August 2025 – Present
Graduate Researcher (PI: Daniel Malinsky, PhD and Alan Cohen, PhD) June 2025 – Present

- Investigating causal relationships of key pro-inflammatory cytokine biomarkers related to inflamm-aging using the nonparametric, constraint-based Peter-Clark (PC) and Fast Causal Inference (FCI) causal discovery algorithms within the `pcalg` R package.
- Comparing inferred causal structures to one another with Structural Hamming Distance (SHD) and Kullback-Leibler (KL) divergence, benchmarking discrepancies in estimated graphical models against expert hypotheses.
- Analyzing effect heterogeneity across sex, comorbidities, and environmental factors within the InCHIANTI (Italy) and Singapore Longitudinal Aging studies to identify candidate inflammatory pathways for intervention.
- Estimating the strength of causal effects in the presence of unobserved confounders by implementing the Latent Variable Intervention-calculus when the Directed Acyclic Graph (DAG) is Absent (LV-IDA) algorithm.
- Defending an Epidemiology Master's thesis utilizing this data with Dr. Allison Aiello, PhD (First Reader, Epidemiology) and Dr. Alan Cohen, PhD (Second Reader).
- Drafting a first-author manuscript detailing the causal discovery approach and biological findings.

New York City Department of Health and Mental Hygiene – Long Island City, NY
Epi Scholar (Public Health Communications Data Analysis) June – August 2025

- Executed a cross-sectional analysis of the agency's first Health Communication Survey (N = 1,972) using SAS and R.
- Retrieved demographic data from the Healthy NYC Panel and applied survey weighting with the American Community Survey to ensure representativeness and mitigate non-response bias.
- Engineered composite indices from Likert-scale survey items to quantify latent constructs of "institutional trust" and "awareness" (aided and unaided), verifying internal consistency before parameterizing an explanatory engagement model for the Bureau of Communications.
- Modeled predictors of public trust and awareness using multivariable logistic regression, calculating adjusted odds ratios to isolate the effects of demographic factors while controlling for confounding variables.
- Conducted statistical power calculations to determine minimum sample size requirements for a follow-up study, ensuring sufficient sensitivity to detect changes in campaign efficacy.

- Operationalized latent constructs of "institutional trust" and "awareness," translating epidemiological hypotheses into quantifiable metrics, producing preliminary benchmarks for the Department of Health.
- Identified statistically significant disparities in print material reach using Chi-square tests and ANOVA, revealing gaps among youth, males, and white non-Latinos to inform targeted market segmentation strategies.
- Presented recommendations to the Commissioner of Health and senior epidemiology leadership, securing funding for a follow-up survey based on the statistical evidence of campaign gaps.

Columbia University Mailman School of Public Health – New York, NY
CDC John R. Lewis Columbia Mailman Summer Public Health Scholar May 2023 – August 2023

- Implemented a community-based participatory research (CBPR) pilot program for the *Barbershop Talk with Brothers* and *Heart of A Woman* initiatives through the Arthur Ashe Institute for Urban Health at SUNY Downstate.
- Assisted the development of the community needs/SDOH survey using iPad kiosks (from Cabrini Technology) across 12 partnering barbershops and salons in Brooklyn zip codes 11225, 11226, and 11216.
- Calculated point estimates and 95% confidence intervals for referral efficacy among participants (N = 333), establishing a baseline conversion rate of 33% from screening to medical appointment to validate pilot scalability.
- Performed univariate and bivariate analyses to characterize participants' SDOH and barriers to medical access, utilizing Pearson's Chi-square tests to assess statistical differences in healthcare utilization across neighborhood and gender strata.
- Supported the delivery of HIV/AIDS, mental health, and stigma curricula in barbershops and salons.
- Disseminated findings on digital health delivery models in non-traditional community settings at the CDC John R. Lewis/Ferguson Scholar poster showcase in Atlanta, GA.

The University of North Carolina at Chapel Hill, The Hill Group – Chapel Hill, NC
Undergraduate Researcher January 2022 – August 2023

- Partnered with Corteva Agriscience on the development of a novel synthetic strategy to access gem-disubstituted vinyl cyclopropanes (VCPs), the core motif in pyrethroid insecticides.
- Synthesized over 47 compounds, including more than 10 disubstituted N-tosyl hydrazones and 10+ vinyl cyclopropanes.
- Optimized reaction conditions for the palladium-catalyzed divinylcyclopropane rearrangement, successfully testing at least 10 reaction conditions to increase cross-coupling generality.
- Elucidated the structure and purity of all intermediates and products using analytical techniques, including chromatography, NMR, and mass spectrometry.
- Maintained lab logistics, including preparing reagents and managing chemical and physical waste, ensuring lab efficiency and safety.

TECHNICAL SKILLS

Software: Jupyter Notebooks, Microsoft Office Suite, MestReNova, Meltwater, Airtable, Ableton Live
Programming Languages: R, SAS, Python, LaTeX, Matlab
Bench Research: Total organic synthesis, purification methods, and NMR

HONORS & AWARDS

Columbia Mailman Tow Doctoral Scholar
2025
- Nominated and selected as a master's student who has overcome barriers to higher education for a research assistantship and two years of funding support for PhD studies at Mailman.

Centers for Disease Control and Prevention John R. Lewis Public Health Scholar
2023
- Recognized as an undergraduate scholar with outstanding potential in public health and biomedical science careers. Participated in the Columbia Mailman Summer Public Health Scholars Program and received a $50,000 scholarship to pursue a Master of Public Health.

American Chemical Society Undergraduate Organic Chemistry Awardee
2023
- Nationally recognized as a top graduating senior in chemistry, demonstrating excellence in organic chemistry through research, coursework, and a commitment to a chemistry career. Awarded Affiliate status by the Division of Organic Chemistry.

Billie and Tommie Hinton Summer Undergraduate Research Fellow
2022
- Chosen for faculty-mentored summer research to support the development of gender equality, diversity, and inclusiveness within the chemistry department.

Hayden B. Renwick Scholar
2020 – 2024
- Awarded to UNC-Chapel Hill minority undergraduates who attain a cumulative GPA of 3.2 or higher. I received this award each semester.

PRESENTATIONS
- "Measuring Engagement and Trust in NYC Department of Health Communications"
  Epi Masters Student Day 2025
  Columbia University Mailman School of Public Health (New York, USA)
  August Epidemiology and Population Health Grand Rounds 2025
  New York City Department of Health and Mental Hygiene (New York, USA)
- "Using Tech-Centric CBPR to Link Low-Income Individuals to Healthcare in Salons and Barbershops: Bridging Health Disparities in Brooklyn, NY"
  John R. Lewis Scholars Poster Showcase 2023
  Centers for Disease Control and Prevention (Atlanta, USA)