Joshua R. Nugent, PhD

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Department of Biostatistics and Epidemiology
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pronouns: he / him / his

Interests & expertise

- Causal inference with applications to (global) public health, medicine, and public policy
- Semiparametric statistics with discrete or continuous exposures
- Integrating (ensemble) machine learning and statistical inference via targeted learning
- Design and analysis of cluster randomized trials, particularly with small samples
- Statistical analyses with complex missingness and dependence
- Interpretation and communication of statistical results
- Teaching statistical concepts
- Anti-racism, equity, inclusion, social justice, conflict resolution

Education

PhD*, Biostatistics, University of Massachusetts Amherst, 2018 - 2022* (*anticipated).

> Dissertation: *Semiparametric estimation of causal effects with complex clustered data.*
> Advisor: Dr. Laura Balzer
> Dissertation committee: Dr. Laura Balzer (chair), Dr. Raji Balasubramanian, Dr. Ted Westling

M.Ed. Secondary Mathematics Education, University of Massachusetts, 2014.

A.B. Urban Studies, Brown University, 2003.

> Study abroad at the Universidad de las Américas, Puebla, Mexico, Spring 2002.

Research support

A Multisectoral Strategy to Address Persistent Drivers of the HIV Epidemic in East Africa (SEARCH-Sapphire)

> Funding: NIH-NIAID U01AI150510 (MPIs: Petersen, Havlir, Kamya)
> Role: Lead statistician and programmer for the TB substudy (SEARCH-TB)

Simplified Isoniazid Preventive Therapy Strategy to Reduce TB Burden (SEARCH-IPT)

> Funding: NIH-NIAID R01AI125000 (PI: Havlir)
> Role: Co-lead statistician and programmer

Leadership & Operations Center (LOC), AIDS Clinical Trials Group (ACTG); Sustainable East Africa Research in Community Health (SEARCH)

> Funding: NIH-NIAID UM1AI068636 (PI: Currier; Havlir)
> Role: Graduate student researcher

Power for Cluster-Randomized Trials: Software, Web app, and Methods

> Funding: NIH-NIGMS 1R01GM121370-01 (PI: Kleinman)
> Role: Graduate student researcher, R package developer

Publications

Peer-reviewed

1. **Nugent, J**, Balzer, L. Evaluating associations between shifts in mobility and COVID-19 case rates in U.S. counties: A demonstration of modified treatment policies for causal inference with continuous exposures. http://arxiv.org/abs/2110.12529 *(Under revision at the American Journal of Epidemiology.)*

2. Kakande E, Christian C, Balzer LB, Owaraganise A, **Nugent J**, DiIeso W, Rast D, Kabami J, Johnson J, Camlin CS, Shade SB, Geng E, Kwarisiima D, Kamya MR, Havlir DV, Chamie G. Cluster RCT of a mid-level manager intervention to promote IPT uptake in Uganda. *(Under review at The Lancet HIV.)*

3. **Nugent, J**, Kleinman, K. Type I error control for cluster randomized trials under varying small sample structures. BMC Med Res Methodol 21, 65 (2021). https://doi.org/10.1186/s12874-021-01236-7

4. Koss CA, Havlir DV, Ayieko J, Kwarisiima D, Kabami J, Chamie G, Atukunda M, Mwinike Y, Mwangwa F, Owaraganise A, Peng J, OliloW, Snyman K, Awuonda B, Clark TD, Black D, **Nugent J**, Brown LB, Marquez C, Okochi H, Zhang K, Camlin CS, Jain V, Gandhi M, Cohen CR, Bukusi EA, Charlebois ED, Petersen ML, Kamya MR, Balzer LB. HIV incidence after pre-exposure prophylaxis initiation among women and men at elevated HIV risk: A population-based study in rural Kenya and Uganda. PLOS Med. 2021 Feb 9;18(2):e1003492. https://doi.org/10.1371/journal.pmed.1003492

In progress: Methods

1. **Nugent, J**, Balzer, L. Two-stage TMLE for cluster randomized trials with few independent units and missingness. *(Dissertation chapter)*

2. **Nugent, J**, Balzer, L. Semiparametric methods for randomized trials with clustering in a single arm. *(Dissertation chapter)*

In progress: Applications

1. Impact of a community-wide HIV test and treat intervention on population level TB transmission in rural Uganda. *(Author list and manuscript being finalized)*

2. Social networks predict PrEP uptake in SEARCH study in rural Kenya and Uganda. *(Author list and manuscript being finalized)*

Pre-registered statistical analysis plans

1. **Nugent J**, Balzer L. Statistical Analysis Plan for Tuberculosis Outcomes in SEARCH TB Study. (2022). *Link forthcoming.*

2. Balzer L, **Nugent J**, Havlir D, Chamie G. Statistical Analysis Plan for Health Outcomes in Phase 1 of the SEARCH-IPT Study. (2021). https://arxiv.org/abs/2111.10467

Conference presentations

1. Kakande E, Christian C, Balzer LB, Owaraganise A, **Nugent J**, DiIeso W, Rast D, Kabami J, Johnson J, Camlin CS, Shade SB, Geng E, Kwarisiima D, Kamya MR, Havlir DV, Chamie G. Cluster RCT of a mid-level manager intervention to promote IPT uptake in Uganda.

   February 2022: Conference on Retroviruses and Opportunistic Infections (Oral presentation)

2. **Nugent J** & Balzer L. *Modified treatment policies for causal inference with continuous exposures.*

October 2021: Session: Statistics in the COVID-19 pandemic, New England Statistical Symposium (Oral presentation)

June 2021: Society for Epidemiologic Research (Poster presentation)

3. Koss CA, **Nugent J**, Balzer L. Social networks predict PrEP uptake in SEARCH study in rural Kenya and Uganda.

March 2021: Conference on Retroviruses and Opportunistic Infections (Oral presentation)

4. **Nugent J**. *Improving Instruction at the University Level.* High-leverage changes faculty can make to improve student learning undergraduate and graduate-level classes.

Spring 2020: University of Massachusetts Amherst (Oral presentation)

Journal review service

Reviewer for *The International Journal of Biostatistics*, *The Journal of Causal Inference.*

Awards and fellowships

University of Massachusetts Amherst, Graduate School

Dissertation Completion Fellowship, Spring 2022

University of Massachusetts Amherst, School of Public Health and Health Sciences

Outstanding Graduate Student Teaching Award, 2020

University of Massachusetts Amherst, School of Education

Camby Scholarship, 2009

University service

University of Massachusetts Amherst, Department of Biostatistics and Epidemiology

Co-founder, Bio-Epi Student Action Group, Spring 2020 - Fall 2021

Organized a group of department graduate students to move department-wide anti-racism and equity initiatives forward. Focus areas included diversity in the student body (recruitment, admissions, retention), faculty diversity (hiring and retention), inclusive teaching practices, and statistical ethics course development. Conducted research on best practices, strategized on implementation, and worked with faculty and administrators to implement our recommendations.

Graduate Student Representative, Fall 2019 - Summer 2021

Served as liaison between graduate students and faculty. Helped troubleshoot student problems and make suggestions for programmatic improvement. Organized community-building events and helped with new student onboarding. Led initiative to recruit a more diverse applicant pool.

Team Lead, COVID-19 Academic Public Health Volunteer Corps, Spring 2020

Organized a team of graduate student volunteers to provide support services to the Peabody (Massachusetts) Health Department (PHD) in the midst of the COVID-19 pandemic, including contact tracing, phone counseling, and data aggregation. Worked closely with the director of the PHD to assess needs, train volunteers, and adapt resources as needs changed.

Volunteer consultant, Five College ASA DataFest, Spring 2019

Assisted undergraduates from Amherst College, Hampshire College, Mt. Holyoke College, Smith College, and UMass with statistical modeling in the ASA DataFest hackathon.

University-level teaching

University of Massachusetts Amherst, School of Public Health and Health Sciences

> Teaching assistant for Dr. Laura Balzer, Biostatistics 683: Introduction to Causal Inference, Fall 2021, including two guest lectures on MTP and TMLE.

> Teaching assistant for Dr. Scott Chasan-Taber, Public Health 223: Introduction to Biostatistics, Fall 2018 - Spring 2020.

Consulting clients & projects

Statistical Consultant, Statistical Consulting & Collaboration Services, University of Massachusetts Amherst, Department of Mathematics and Statistics, June 2020 - June 2021

> EnCompass, LLC: External review of statistical analysis in a study to determine prevalence of and risk factors for forced labor among migrant workers in southeast Asia.

> Franklin County Council of Governments Health Equity Working Group: Statistical analysis of impacts of COVID-19 pandemic in western Massachusetts.

> University of Massachusetts Amherst College of Natural Sciences: Development of two survey instruments and analysis / interpretation / communication of results.

Software & other skills

Software expertise

> R, R Markdown (examples at joshua-nugent.github.io)
> Tidyverse (dplyr, ggplot)
> R package development (contributor to `clusterPower` package)
> GitHub

Software fluency

> Python
> Shiny
> Stan
> SAS
> Stata
> LSF (for computing clusters)

Language fluency

> English
> Spanish

Pre-doctoral work experience

> Mathematics Teacher, Amherst Regional High School, September 2010 - June 2018
>> Taught students in all grades at the AP, honors, college prep, and developmental level. Updated curricula, planned and executed lessons, assessed student work, communicated with parents about student progress. Led on-site professional development courses for colleagues focused on differentiated instruction. Worked with the department head to lead the transition to a discovery-based core curriculum. Worked with the principal on assessment modernization initiatives. Contributed to the development of Advisory curriculum focused on issues of social justice and social-emotional

learning. Developed and piloted new discovery-based Statistics II course. Supervised and mentored pre-service teachers. Advised the Women's Rights Club as they prepared the "Consent Week" peer education event. Coached the national championship-winning girls varsity Ultimate Frisbee team.

Ombuds Assistant, University of Massachusetts Amherst, September 2009 - August 2010

Fielded and investigated complaints from various members of the University community, resolved conflicts and mediated disputes between faculty and students, oversaw academic honesty and academic grievance hearings, referred students to appropriate campus resources, oversaw the implementation of a new web site, led on-campus outreach.

Director, Peace from A to Z After-School Program at P.S. 24, September 2006 - June 2008

Oversaw all facets of a 350-student, 45-staff member after-school program at a public elementary school in Brooklyn, NY. Hired and trained staff, oversaw curriculum development in the arts, conflict resolution, and social justice, generated reports and data for funding agencies, communicated with families and teachers regarding students' academic and social-emotional progress, coordinated closely with the school administration to set goals and resolve problems, arranged for continuing professional development for staff, assisted in writing grant applications, led budgeting process, kept program in compliance with local, state, and federal reporting requirements and regulations, successfully led program through severe financial crisis in my first months as director.