

## CONTACT INFORMATION

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## RESEARCH INTERESTS

Inference with high-dimensional data using targeted maximum likelihood estimation; data visualization; statistical machine learning; statistical methods for HIV/AIDS research; statistical methods for genetic research; statistical methods for cancer research; statistical methods for neurological research; developing statistical packages

## EDUCATION

**University of Washington**, Seattle, Washington  
 Ph.D., Biostatistics      2014–2019 (expected)  
 M.S., Biostatistics      2017  
 Advisors: Marco Carone, Ph.D. and Noah Simon, Ph.D.

**Pomona College**, Claremont, California  
 B.A., Mathematics      2010–2014  
 Thesis: Shrinkage Estimators for High-Dimensional Covariance Matrices  
 Advisor: Johanna Hardin, Ph.D.

## HONORS AND AWARDS

**University of Washington Department of Biostatistics:**

- ASA Biometrics Section Travel Award for JSM 2018      January 2018
- WNAR Most Outstanding Oral Paper Award      June 2017
- Biostatistics Department Conference Travel Award      Spring 2017
- Graduate School Fund for Excellence and Innovation Travel Award      Spring 2017
- Graduate and Professional Student Senate Travel Grant      Spring 2017
- Top Scholar Incoming Student Award      September 2014

**Pomona College:**

- Distinction in the Senior Exercise      May 2014
- Inducted into Sigma Xi Scientific Research Honor Society      May 2014
- Pomona-Pitzer Varsity Swimming and Diving Captain      2013–2014
- All SCIAC Conference Academic Team      2013 and 2014
- All SCIAC Conference Swimmer      2013
- UCLA DataFest Best Insight Award      June 2013

## RESEARCH EXPERIENCE

**Fred Hutchinson Cancer Research Center**, Seattle, Washington  
 Statistical Center for HIV/AIDS Research & Prevention (SCHARP)  
*Graduate Research Assistant*      Summer 2015 – Present  
 Advisor: James Hughes, Ph.D.

**Stanford University School of Medicine**, Stanford, California  
*Integrative Cancer Biology Program Research Fellow*      Summer 2013  
 Advisors: Benedict Anchang, Ph.D. and Sylvia Plevritis, Ph.D.

## TEACHING EXPERIENCE

### University of Washington, Seattle, Washington

*Pre-Doctoral Instructor (with Kelsey Grinde)*

BIOST 311 — Regression Methods in the Health Sciences

Spring 2018

Faculty advisors: James Hughes, Ph.D. and Barbara McKnight, Ph.D.

*Lead Graduate Teaching Assistant*

BIOST 511 — Medical Biometry I

Autumn 2017

Instructor: James Hughes, Ph.D.

*Co-instructor (with Gillian Tarr [2016], Jessica Williams-Nguyen [2017])*

School of Public Health Math and R skills

Autumn 2016, 2017

preparatory workshop (first offered 2016)

Advisor: Annette Fitzpatrick, Ph.D.

*Graduate Teaching Assistant*

BIOST 311 — Regression Methods in the Health Sciences

Spring 2017

Instructor: Anna Plantinga

BIOST 571 — Advanced Regression Methods for Dependent Data

Winter 2017

Instructor: Adam Szpiro, Ph.D.

R package development for introductory biostatistics courses

Summer 2014–Summer 2015

Advisor: Scott Emerson, M.D. Ph.D.

*Co-instructor*

First Year Statistical Theory Exam Review Sessions

Spring 2016

Advisor: Scott Emerson, M.D. Ph.D.

*Teaching Assistant*

Summer Institute for Statistics for Big Data

Module 3, Reproducible Research for Biomedical Big Data

July 2017

Instructors: Keith Baggerly, Ph.D. and Karl Broman, Ph.D.

Module 2, Visualization of Biomedical Big Data

July 2016, 2017

Instructors: Dianne Cook, Ph.D. and Heike Hofmann, Ph.D.

Module 1, Accessing Biomedical Big Data

July 2015

Instructors: Jeff Leek, Ph.D. and Raphael Gottardo, Ph.D.

*Guest Lecturer*

BIOST 311: *Penalized regression and model selection*

Spring 2017

BIOST 561: *Unix, shell, and cluster computing*

Autumn 2016, 2017

BIOST 511: *Lecture on regular course content*

Autumn 2017

### Pomona College, Claremont, California

*Mentor/Teaching Assistant*

MATH 58b — Introduction to Biostatistics

Spring 2014

MATH 58 — Introduction to Statistics

Fall 2013

Instructor: Johanna Hardin, Ph.D.

*Grader*

MATH 58b — Introduction to Biostatistics

Spring 2013

Instructor: Johanna Hardin, Ph.D.

MATH 31H — Honors Calculus II

Fall 2012

Instructor: Shahriar Shahriari, Ph.D.

## PUBLICATIONS

\* denotes joint first-author contribution

6. **Williamson BD**, Gilbert PB, Simon N, and Carone M. Nonparametric variable importance assessment using machine learning techniques. *University of Washington Department of Biostatistics Working Paper Series*, (422), 2017 (under review in *Biometrics*)
5. Hanscom B, Donnell D, **Williamson B**, and Hughes JP. Adaptive non-inferiority margins un-

der observable non-constancy. *University of Washington Department of Biostatistics Working Paper Series*, (417), 2017 (under review in *Statistical Methods in Medical Research*)

4. \*Feng J, \***Williamson BD**, Carone M, and Simon N. Nonparametric variable importance using an augmented neural network with multi-task learning. 35th International Conference on Machine Learning, 2018
3. Anchang B, Davis KL, Fienberg H, **Williamson B**, Bendall SC, Karacosta L, Tibshirani R, Nolan GP, and Plevritis SK. DRUG-NEM: optimizing drug combinations using single-cell perturbation response to account for intratumoral heterogeneity. *Proceedings of the National Academy of Sciences*, 115(18):E4294–E4303, 2018
2. Safren SA, Hughes JP, Mimiaga MJ, Moore AT, Friedman RK, Srithanaviboonchai K, Limbada M, **Williamson BD**, Elharrar V, Cummings V, Magidson JF, Gaydos CA, Celentano D, and Mayer KH for the HPTN063 Study Team. Frequency and predictors of estimated HIV transmissions and bacterial STI acquisition among HIV-positive patients in HIV care across three continents. *Journal of the International AIDS Society*, 19, 2016
1. Ritchwood TD, Hughes JP, Jennings L, MacPhail C, **Williamson B**, Selin A, Kahn K, Gómez-Olivé XF, and Pettifor A. Characteristics of age-discordant partnerships associated with HIV risk among young South African women (HPTN 068). *Journal of Acquired Immune Deficiency Syndromes*, 72:423–429, 2016

#### PRESENTATIONS

**“Assessing Variable Importance Nonparametrically using Machine Learning Techniques”**

2018 *Joint Statistical Meetings*, Vancouver, BC, Canada (selected for an *ASA Biometrics Section Travel Award*)

2017 *Western North American Region (WNAR) of the International Biometric Society*, Santa Fe, NM (selected as the *Most Outstanding Oral Paper*)

*University of Washington Statistical Learning Applied to Biostatistics (SLAB) Lab*, Seattle, WA

2016 *University of Washington Department of Biostatistics Student Seminar*, Seattle, WA

**“An Introduction to Targeted Learning”**

2017 *University of Washington Department of Biostatistics Student Seminar*, Seattle, WA

**“Shrinkage Estimators for High-Dimensional Covariance Matrices”**

2014 *Pomona College Mathematics Seminar*, Claremont, CA

**“Automating Cell Gating and Creating a Nested Effects Model to Compare Drug Effects”**

2013 *Stanford University Center for Cancer Systems Biology Meeting*, Stanford, CA

#### POSTER PRESENTATIONS

4. **Williamson BD**, Magaret CA, Borate B, Carpp LN, Georgiev I, Setliff I, Dingens A, Benkeser DC, Simon N, Carone M, Montefiori D, Alter G, Yu WH, DeCamp AC, Juraska M, Edlefsen PT, Karuna S, Edugupanti S, and Gilbert PB. HIV-1 Sequence Predictors of VRC01 Neutralization Sensitivity. 25th HIV Dynamics and Evolution Meeting. April 2018, Leavenworth, WA.
3. **Williamson B**, Gilbert P, Simon N, and Carone M. Assessing Variable Importance Nonparametrically using Machine Learning Techniques. University of Washington Biostatistics Department Retreat. November 2017, Seattle, WA.
2. **Williamson B**, Gilbert P, Simon N, and Carone M. Assessing Variable Importance Nonparametrically using Machine Learning Techniques. Joint Statistical Meetings. July 2017, Baltimore, MD.
1. **Williamson B**, Carone M, and Simon N. Assessing Variable Importance Nonparametrically. University of Washington Biostatistics Department Retreat. September 2015, Blaine, WA.

## OTHER PRESENTATIONS

1. **Williamson B**, Carone M, and Simon N. Assessing Variable Importance Nonparametrically using Machine Learning Techniques. Sigma Xi Student Research Showcase. April 2017, <https://briandwilliamson.tumblr.com/>

## PROFESSIONAL SOCIETIES

<b>Western North American Region of the International Biometric Society (WNAR)</b> <i>Student Member</i>	Autumn 2014 – Present
<b>American Statistical Association</b> <i>Student Member</i>	Autumn 2013 – Present
<b>Bernoulli Society</b> <i>Student Member</i>	Spring 2016 – Present

## UNIVERSITY SERVICE

<b>University of Washington Department of Biostatistics</b> <i>Student Member</i>	
Educational Policy and Teaching Evaluation Committee (EPTEC)	Autumn 2015 – Present
<i>Peer Mentor</i> Peer mentoring program	Autumn 2016 – Present
<i>Co-organizer</i> Statistical Learning Applied to Biostatistics (SLAB) Lab	Autumn 2016 – Autumn 2017
<i>Student Member</i> Diversity Committee	Autumn 2016 – Present
<i>Student Member</i> Website Committee	Spring 2015 – Summer 2015

## PROFESSIONALLY-RELATED SERVICE

- *Session Chair*, “Quantification, Association Testing, and Integration of the Microbiome”, WNAR/ENAR Invited Session, JSM 2017 August 2017
- *Alumni Mentor*, SagePost 47 Summer 2015 – Present
- *Statistical Consultant*, Sierra Streams Institute, Nevada City, California Spring 2016

## SOFTWARE

**vimp** and **vimpy** packages – R and Python software implementing variable importance methods (Available on GitHub at <https://github.com/bdwilliamson/vimp> and <https://github.com/bdwilliamson/vimpy>)

**uwIntroStats** package – R software for introductory biostatistics students, developed with Scott Emerson M.D. Ph.D., Andrew Spieker Ph.D., Travis Hee Wai, and Solomon Lim (Available on CRAN at <https://cran.r-project.org/web/packages/uwIntroStats/>)

## TECHNICAL SKILLS

Statistical packages: Advanced knowledge of R, basic knowledge of SAS and Stata  
Languages: Proficient in Python, basic knowledge of Java, C++, SML  
Applications: Advanced knowledge of L<sup>A</sup>T<sub>E</sub>X, common Windows software, Proficient in git + GitHub  
Operating Systems: Advanced knowledge of Unix/Linux, Windows

PROFESSIONAL EXPERIENCE

**Global Market Insite, Inc. (GMI)**, Bellevue, Washington  
*Intern*

Summer 2012