# Brian D. Segal

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## EDUCATION

**Ph.D. in Biostatistics**, University of Michigan, Ann Arbor, MI — July 2017

**M.S. in Biostatistics**, University of Michigan, Ann Arbor, MI — May 2013

**B.S. in Biology**, Virginia Tech, Blacksburg, VA, *summa cum laude* — May 2007

## POSITIONS

**Flatiron Health**, New York, NY
Senior Quantitative Scientist — Mar 2020 – Present
Quantitative Scientist — Aug 2017 – Feb 2020

**Google, Advanced Measurement Technologies**, New York, NY
Intern — May 2016 – Aug 2016

**University of Michigan, Department of Orthopaedic Surgery**, Ann Arbor, MI
Research Associate II — Sep 2015 – Nov 2016

**University of Michigan, Institute for Social Research**, Ann Arbor, MI
Graduate Student Research Assistant — Sep 2014 – Aug 2015
Regents' Fellow — Sep 2013 – Aug 2014

**University of Michigan, Department of Biostatistics**, Ann Arbor, MI
Graduate Student Research Assistant — Jan 2012 – Aug 2013

**Abt Associates, Environment and Resources Division**, Bethesda, MD
Analyst — Jun 2010 – Mar 2011
Associate Analyst — Jun 2008 – May 2010
Research Assistant — Jul 2007 – May 2008

**Virginia Tech, Department of Civil and Environmental Engineering**, Blacksburg, VA
Research Assistant — Aug 2006 – May 2007

**Environmental Protection Agency, Office of Pesticide Programs, Communication Services Branch**, Crystal City, VA
Intern — May 2006 – Aug 2006

**Virginia Tech, Department of Biological Sciences**, Blacksburg, VA
Research Assistant — May 2005 – Aug 2005

## PUBLICATIONS

### *Under review and in preparation*

**Segal, B. D.**, Curtis, M. D., Baxi, S. S., Capra, W. B, Garrett-Mayer, D., Hobbs, B. P., Hong, D. S., Hubbard, R. A., Tan, W. K., Zhu, J., Sarkar, S., Samant, M. (under review). Hybrid control arms with RWD for cancer trials: Why, what, when, and how.

Tan, W. K., Bryan, J., **Segal, B. D.**, Bellemo, L., Nussbaum, N., Tucker, M., Torres, A. Z., Bennette, C., Capra, W. B., Curtis, M. D., Miksad, R. A. (in preparation). Use of an electronic health record-derived database to create external cohorts that emulate control arms for cancer clinical trials.

### *Accepted*

**Segal, B. D.** (2019). Toward replicability with confidence intervals for the exceedance probability. The American Statistician. doi:10.1080/00031305.2019.1678521.

**Segal, B. D.**, Braun, T., Gonzalez, R., and Elliott, M. R. (2019). Tests of matrix structure for construct validation. Psychometrika, 84(1), 65–83. doi:10.1007/s11336-018-9647-4 [open access version].

**Segal, B. D.**, Elliott M., Braun T., and Jiang, H. (2018). P-splines with an $\ell_1$ penalty for repeated measures. Electronic Journal of Statistics, 12(2), 3554–3600. doi:10.1214/18-EJS1487.

Burgard, S. A., Lin, K. Y., **Segal, B. D.**, Elliott, M. R., and Seelye, S. S. (2018). Stability and change in health risk behavior profiles of U.S. adults. Journal of Gerontology: Series B. doi:10.1093/geronb/gby088.

**Segal, B. D.**, Bennette, C. S. (2018). Re: "Transportability of trial results using inverse odds of sampling weights." American Journal of Epidemiology. doi:10.1093/aje/kwy190.

**Segal, B. D.**, Braun, T., Elliott, M. R. and Jiang, H. (2018). Fast approximation of small p-values in permutation tests by partitioning the permutations. Biometrics, 74(1), 196–206. doi:10.1111/biom.12731.

## TALKS, POSTERS, AND ROUNDTABLES

Talk: "Hybrid control arms with RWD for cancer trials: Why, what, when, and how." JSM, Aug 2020.

Roundtable: "Case studies in the use of real world evidence to improve regulatory decision making." ASA biopharmaceutical section regulatory-industry workshop, Sep 2019.

Poster: "Tests of matrix structure for construct validation." American psychological association conference, Aug 2019.

Talk: "Complex Data in, Nuanced Answers Out: Lessons Learned Analyzing Electronic Health Record Data in Oncology." JSM, Jul 2019.

Speed session (talk and poster): "Quantifying the number of events borrowed from external data in hybrid control arms." JSM, Jul 2019.

Talk: "Biostatistics and Flatiron Health: Harnessing the power of real world data through quantitative methods for cancer treatment, access, and care." University of Michigan symposium on big data, human health and statistics, Jul 2019.

Talk: "Exceedance probability for parameter estimates." JSM, Jul 2018.

Talk: "P-splines with an $\ell_1$ penalty for repeated measures." Statistical learning and data science/nonparametric statistics conference, Jun 2018.

Poster (winner of best poster from Biostatistics department): "Tests of matrix structure for construct validation." Michigan Student Symposium for Interdisciplinary Statistical Sciences, Mar 2017.

Poster: "P-splines with an $\ell_1$ penalty for repeated measures." ENAR, Mar 2017.

Talk (winner of travel award): "Fast approximation of small p-values in permutation tests by partitioning the permutation space." JSM Biometrics section student paper awards session, Aug 2016.

Poster: "Fast approximation of small p-values in permutation tests by partitioning the permutation space." ENAR, Mar 2016.

## TECHNICAL REPORTS

**Segal, B. D.**, Tan, W. K. A note on the amount of information borrowed from external data in hybrid controlled trials with time-to-event outcomes. https://arxiv.org/abs/2010.00433, Oct 2020.

Amarakoon, S., Smith, J., **Segal, B. D.** Lithium-ion batteries and nanotechnology for electric vehicles: Life cycle assessment study. U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics, Design for the Environment Program. EPA 744-R-08-001, Apr 2012.

Greco, S., Smith, J., **Segal, B. D.**, Post, E., Lynch, M., Hattis, D. Evaluating methods for quantifying human noncancer health risks: Case study application, draft report. US EPA, Mar 2009.

Greco, S., Acquaye, A., Peak, K., **Segal, B. D.**, Rast, M. Framework for estimating costs and benefits associated with changes in the reference dose at federal facility hazardous waste sites. US EPA, Oct 2008.

**Segal, B. D.** Biofilm forming properties of the ammonia oxidizing bacteria Nitrosomonas europaea. Undergraduate research project. Department of Civil and Environmental Engineering, Virginia Tech, May 2007.

## SOFTWARE

`exceedProb`: R package for computing confidence intervals for the exceedance probability of normally distributed estimators. Available on the CRAN at https://CRAN.R-project.org/package=exceedProb.

`matrixStrucTest`: R package for testing symmetric matrices for block-diagonal structure under the null of exchangeable off-diagonal elements. Based on a permutation test with Hubert's gamma and a t-statistic. Available on the CRAN at https://CRAN.R-project.org/package=matrixStrucTest.

`fastPerm`: R package for quickly approximating small permutation p-values for the difference and ratio of means. Available at `https://github.com/bdsegal/fastPerm`.

`gammaDist`: R package for computing the distribution and density of the difference of two gamma random variables under the null of equal distributions. Includes a saddlepoint approximation to the density. Available at `https://github.com/bdsegal/gammaDist`.

***In development***

`psplinesl1`: R package for fitting additive mixed models with P-splines and an $\ell_1$ penalty using alternating direction method of multipliers and cross validation. Available at `https://github.com/bdsegal/psplinesl1`.

## TEACHING EXPERIENCE

Instructor: Statistical Programming Workshop, University of Michigan, Winter 2016. Notes available at `https://bdsegal.github.io/BSA-computing-workshop`.

Grader: Introduction to Public Health (PUBHLTH 610), University of Michigan, Fall 2014

Graduate Student Instructor: Introduction to Biostatistics (BIOSTAT 503), University of Michigan, Fall 2011

## HONORS AND AWARDS

Best Poster from Biostatistics Departments at Michigan Student Symposium for Interdisciplinary Statistical Sciences, "Tests of matrix structure for construct validation" 2017

Rackham Predoctoral Fellowship 2016

Travel Award for JSM, Biometrics Section, "Fast approximation of small p-values in permutation tests by partitioning the permutation space" 2016

Rackham Graduate Student Research Grant 2014

Regents' Fellowship 2013

Phi Beta Kappa 2005

Virginia Tech Paul Dirksen Smith Cycling Scholarship 2004

## PROFESSIONAL ACTIVITIES

Reviewer for: *Annals of Applied Statistics, Biometrics, Clinical Trials, Journal of the American Statistical Association (Applications and Case Studies), Statistical Methods in Medical Research*

Session Chair, "Data science," JSM Jul/Aug 2018

Session Chair, "Satistical challenges in the analysis of EHR data," JSM Jul/Aug 2018

Member, Eastern North American Region International Biometric Society 2015 – Present

Member, American Statistical Association 2012 – Present

## TECHNICAL SKILLS

- Proficient: R, SQL (basic queries, joins, and aggregations), Git (basic branching and merging), SAS
- Experience: Python, Stan, C, Mplus, AWS

## REFERENCES

Available upon request