

CONTACT INFORMATION

Vanderbilt University Medical Center
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EDUCATION

- B.S., Mathematics. Northeastern University, Boston, MA, 2011
- M.S., Biostatistics. University of Washington, Seattle, WA, 2015
- Ph.D., Biostatistics. University of Washington, Seattle, WA, 2016
Dissertation: “Recovering Natural History: Modeling Cardiovascular Biomarkers in the Presence of Endogenous Medication Use”
- Postdoctoral Researcher, University of Pennsylvania, Department of Biostatistics, Epidemiology, and Informatics, and Center for Causal Inference, 2016–2018
- Associate Fellow, Leonard Davis Institute of Health Economics, 2017–2018

ACADEMIC APPOINTMENTS

- Assistant Professor of Biostatistics, Vanderbilt University Medical Center, 2018–

OTHER EMPLOYMENT

- Research Assistant, Beth Israel Deaconess Medical Center, 2010–2012
- Research Assistant, Collaborative Health Studies Coordinating Center, 2012–2015
- Research Assistant, Fred Hutchinson Cancer Research Center, 2015–2016

PROFESSIONAL ORGANIZATIONS

- International Biometric Society (Eastern North American Region), 2014–
- American Statistical Association, 2015–
- International Biometric Society (Western North American Region), 2015–2017

PROFESSIONAL ACTIVITIES: INTRAMURAL

University of Washington

- Student Representative, Departmental Self-Study Committee, 2012–2013
- Facilitator, University of Washington Annual TA/RA Conference, 2015

- Member, Educational Policy and Teaching Evaluation Committee, 2014–2016
- Member, Faculty/Student Relations Committee, 2015–2016

University of Pennsylvania

- Member, Department of Biostatistics, Epidemiology, and Informatics Post-Doc Training Task Force, 2017-2018

Vanderbilt University Medical Center, Department of Biostatistics

- Founder/Organizer, Vanderbilt Causal Inference Workshop, 2018–
- Organizer, Weekly Biostatistics Seminar, 2018–
- Member, Faculty Search Committee, 2019–
- Member, Qualifying Exam Committee, 2019–

PROFESSIONAL ACTIVITIES: EXTRAMURAL

Committees

- Member, ENAR Distinguished Student Paper Awards Committee, 2018–
- Member, David P. Byar Young Investigator Award Committee, 2018–
- ENAR Poster Session Judge, 2019

Conference Sessions Chaired

1. Survival Analysis and Semi-parametric and Non-parametric Models. ENAR: Washington D.C., March 2017.
2. Recent Developments in Observational Data. WNAR: Santa Fe, NM, June 2017.
3. Comparative Effectiveness Research. ENAR: Atlanta GA, March 2018.

Reviewer

- *British Medical Journal* (2016)
- *Journal of the Royal Statistical Society, Series C* (2016)
- *Pharmacoepidemiology and Drug Safety* (2016, 2017)
- *Biostatistics* (2016, 2017)
- *International Journal of Biostatistics* (2017)
- *American Journal of Epidemiology* (2015, 2016, 2017, 2018)
- *Journal of the American Statistical Association* (2017, 2018)
- *PLOS One* (2018)
- *Circulation: Cardiovascular Quality and Outcomes* (2018, 2019)
- *Statistics in Medicine* (2019)

Awards and Honors

- University of Washington Department of Biostatistics Retreat: Best Research Poster Award (as selected by incoming students), 2013
- University of Washington Department of Biostatistics: Outstanding Teaching Assistant Award, 2014
- WNAR Student Paper Competition: Most Outstanding Paper Award, 2015
- WNAR Student Paper Competition: Most Outstanding Oral Presentation Award, 2015
- Atlantic Causal Inference Conference: Thomas R. Ten Have Poster Presentation Award Runner-up, 2017

TEACHING ACTIVITIES AND MENTORING

Instructor: Medical School Courses

University of Pennsylvania Perelman School of Medicine

- Health Policy Research 604 - Introduction to Statistics for Health Policy (Autumn 2017)
Enrollment: 24; Mean evaluation: 4.7/5.0

Instructor: Undergraduate Courses

University of Washington

- Biostatistics 311 - Regression Methods in the Health Sciences (Spring 2016)
Enrollment: 7; Median evaluation: 4.7/5.0

Instructor: High School Courses

Massachusetts Institute of Technology Educational Studies Program

- Counting Principles (Summer 2009)
- Calculus AB (September 2009 - May 2010)
- Multivariable Calculus (Summer 2010)
- Counting Principles (Summer 2011)
- Calculus BC (September 2010 - May 2011)
- Calculus BC (September 2011 - May 2012)

Instructor: Short Courses

Vanderbilt Center for Quantitative Science Summer Institute

- Introduction to Causal Inference (August 2019)

Massachusetts Institute of Technology Educational Studies Program

- Introduction to Calculus (2008, 2009)
- Group Theory (2008, 2009)
- Number Theory (2008, 2009)
- Stochastic Processes (2009)
- Introduction to Topology (2009)
- Introduction to Real Analysis (2009)
- Complex Variables (2009, 2010)

Teaching Assistantships

Northeastern University

- MATH U110 - College Algebra (Autumn 2008)
- MATH U110 - College Algebra (Spring 2009)

University of Washington

- Biostatistics 524 - Design of Medical Studies (Spring 2014)
Enrollment: 34; Median evaluation: 4.9/5.0
- Biostatistics 570 - Advanced Regression Methods I (Autumn 2014)
Enrollment: 44; Evaluation not conducted
- Biostatistics 571 - Advanced Regression Methods II (Winter 2015)
Enrollment: 36; Median evaluation: 4.2/5.0
- Biostatistics 524 - Design of Medical Studies (Spring 2015)
Enrollment: 38; Median evaluation: 4.9/5.0

Advising and Mentoring

- Marlena Norwood (*Ad hoc* undergraduate honors project), 2016
Topic: Simulation studies and nonparametric bootstrapping methods
- Coleman Harris (Summer research project advisor), 2018
Topic: Causal inference and cost-effectiveness methods

Research Supervision

- Nicholas Illenberger, Ph.D. committee member (2019–)
- Varvara Probst, MPH committee member (2019–)
- Thomas Kink, MPH committee member (2018–)

RESEARCH PROGRAM

Ongoing Research

U01 IP 001063-03 (PI: Halasa) NIH/NCIRD <i>Enhanced Surveillance for New Vaccine Preventable Diseases</i> Role: Biostatistician	09/01/16 – 08/31/21	15%
U01 AI 132004-02 (PI: Halasa) NIH/NIAID <i>High vs. Standard Dose Flu Vaccine in Adult Stem Cell Transplant Recipients</i> Role: Biostatistician	07/05/17 – 06/30/20	5%
U01 AI 125135-03 (PI: Halasa) NIH/NIAID <i>Comparison of High vs. Standard Dose Flu Vaccine in Pediatric Stem Cell Transplant Recipients</i> Role: Biostatistician	08/19/16 – 07/31/19	10%
R01 DK 100694-04:06 (PI: Mayberry) NIH/NIDDK <i>Improving Medication Adherence Among Underserved Patients with Type 2 Diabetes</i> Role: Biostatistician	07/14/14 – 04/30/20	30%
P30 DK 092986-08 (Pilot PI: Nelson) NIH/NIDDK <i>Center for Diabetes Research Pilot & Feasibility Award</i> Role: Biostatistician	08/01/17 – 07/31/19	10%
P50 CA 098131 (PI: Arteaga) NIH/NCI <i>SPORE in Breast Cancer</i> Role: Biostatistician	09/11/08 – 08/31/19	10%
P30 CA 068485 (PI: Pietenpol) NIH/NCI <i>Cancer Center Support Grant</i> Role: Biostatistician	09/10/10 – 08/31/20	10%
RWJF 76037 (PI: Schmidt, Grande, Spieker) <i>Assessing Primary Care Physicians' Attitude Toward and Level of Engagement in Implementation of Medicaid Work Requirements</i> Role: Co-Project Director	11/30/18 – 11/29/19	7%

ORIGINAL PUBLICATIONS

* - Indicates joint authorship.

Peer-reviewed Publications

1. Wang L, Spieker AJ, Li J, Rutkove SB. (2011). Electrical impedance myography for monitoring motor neuron loss in the SOD1 G93A amyotrophic lateral sclerosis rat. *Clinical Neurophysiology* 122(12), 2505–2511.
2. Nodera H, Spieker AJ, Sung M, Rutkove SB. (2011). Neuroprotective effects of Kv7 channel agonist, retigabine, for cisplatin-induced peripheral neuropathy. *Neuroscience Letters* 505(3), 223–227.
3. Narayanaswami P, Spieker AJ, Mongiovi P, Keel, JC, Muzin SC, Rutkove SB. (2012). Utilizing a handheld electrode array for localized muscle impedance measurements. *Muscle and Nerve* 46(2), 257–263.
4. Li J, Staats W, Spieker AJ, Sung M, Rutkove SB. (2012). A technique for performing electrical impedance myography in the mouse hind limb: data in normal and ALS SOD1 G93A animals. *PLoS One* 7(9), e45004.
5. Sung M, Spieker AJ, Narayanaswami P, Rutkove SB. (2013). The effect of subcutaneous fat on electrical impedance myography when using a handheld electrode array: the case for measuring reactance. *Clinical Neurophysiology* 124(2), 400–404.
6. Li J, Spieker AJ, Rosen GD, Rutkove SB. (2013). Electrical impedance alterations in the rat hind limb with unloading. *Journal of Musculoskeletal and Neuronal Interactions* 13(1), 37–44.
7. Spieker AJ, Narayanaswami P, Fleming L, Keel JC, Muzin SC, Rutkove SB. (2013). Electrical impedance myography in the diagnosis of radiculopathy. *Muscle and Nerve* 48(5), 800–805.
8. Sung M, Li J, Spieker AJ, Spatz J, Ellman R, Ferguson G, Bateman T, Rosen GD, Bouxsein M, Rutkove SB. (2013). Spaceflight and hind limb unloading induce similar changes in electrical impedance characteristics of mouse gastrocnemius muscle. *Journal of Musculoskeletal and Neuronal Interactions* 13(4), 405–411.
9. Spieker AJ, Delaney JAC, McClelland RL. (2015). Evaluating the treatment effects model for estimation of cross-sectional associations between risk factors and cardiovascular biomarkers influenced by medication use. *Pharmacoepidemiology and Drug Safety* 24(12), 1286–1296.
10. Hsi RS, Spieker AJ, Stoller ML, Jacobs DR Jr., Reiner AP, McClelland RL, Kahn AJ, Chi T, Szklo M, Sorensen MD. (2015). Coronary artery calcium score and association with recurrent nephrolithiasis: the Multi-Ethnic Study of Atherosclerosis. *Journal of Urology* 195(4), 971–976.

11. Johnson M, Pierson ER., Spieker AJ, Nielsen S, Posso S, Kita M, Buckner J, Governan J. (2016). Distinct T cell signatures define subsets of multiple sclerosis patients. *Neurology: Neuroimmunology & Neuroinflammation* 3(5):e278.
12. Spieker AJ, Huang Y. (2017). A method to address between-subject heterogeneity for identification of principal surrogate markers in repeated low-dose challenge HIV vaccine studies. *Statistics in Medicine*, 36(26), 4167–4181.
13. Stephens-Shields AJ, Spieker AJ, Yang W, Anderson A, Drawz P, Fischer M, Sozio SM, Feldman H, Joffe M, Green T, The CRIC Study Investigators. (2017). Blood pressure and the risk of chronic kidney disease progression using multistate marginal structural models in the CRIC study. *Statistics in Medicine*, 36(25), 4071–4080.
14. Spieker AJ, Roy JA, Mitra N. (2018). Analyzing medical costs with time-dependent treatment: The nested g-formula. *Health Economics*, 27(7), 1063–1073.
15. Spieker AJ, Delaney JAC, McClelland RL. (2018). A method to account for covariate-specific treatment effects when estimating biomarker associations in the presence of endogenous medication use. *Statistical Methods in Medical Research*, 27(8), 2279–2293.
16. Wan J*, Oganisian A*, Spieker AJ, Hoffstad OJ, Mitra N, Margolis DJ, and Takeshita J. (2019). Racial/Ethnic Variation in Use of Ambulatory and Emergency Care for Atopic Dermatitis Among U.S. Children. To appear in *Journal of Investigative Dermatology*.

Invited Commentaries

17. Spieker AJ. (2019). Comment on “Penalized Spline of Propensity Methods for Treatment Comparison” by Zhou, Elliott, and Little. To appear in *Journal of the American Statistical Association*.

Submitted Manuscripts and Papers in Preparation

18. Spieker AJ, Oganisian A, Ko E, Roy JA, Mitra N. A causal approach to analysis of censored medical costs in the presence of time-varying treatment. Submitted to *Journal of the American Statistical Association*, [arXiv:1705.08742](https://arxiv.org/abs/1705.08742).
19. Spieker AJ, Roy JA, Mitra N. Causal estimation of net monetary benefit with a generalization to alternative survival measures. Pending submission to *The International Journal of Biostatistics*.
20. Spieker AJ, Illenberger N, Ko E, Mitra N. The determination curve: a probabilistic framework for cost-effectiveness estimation. Pending submission to *Annals of Applied Statistics*.
21. Illenberger N, Mitra N, Spieker AJ. A new framework for subgroup discovery in cost-effectiveness estimation. Pending submission to *Statistics in Medicine*.

22. Halasa N, Piya B, Stewart L, Payne D, Woron A, Thomas L, McHenry R, Chappell J, Spieker AJ, Fannesbeck C, Wikswo M, Parashar U, Bowen M, Vinje J, Hall AJ, Dunn JR, and the New Vaccine Surveillance Network (NVSN). The changing landscape of pediatric viral enteropathogens in the post-rotavirus vaccine era. Pending submission to *JAMA Pediatrics*.
23. Klink T, Khuri-Bulos N, Piya B, Spieker AJ, Faouri S, Shehabi A, Williams JV, and Halasa NB. Evaluating the diagnostic accuracy of the WHO severe acute respiratory infection (SARI) criteria in a middle eastern pediatric cohort. Pending submission to *The Lancet Infectious Diseases*.
24. Batarseh E, Hamdan L, Piya B, Stewart L, Spieker AJ, Chappell J, Dunn J, Payne D, Vinje J, Hall A, and Halasa N. Comparison of demographics, clinical characteristics, and seasonal variations in GII.4 versus other GII norovirus. Pending submission.

PRESENTATIONS

Invited Workshops

1. Computing session for propensity score methods. First Causal Inference and Big Data Summer Institute: Philadelphia, PA, July 2017.
2. Computing session for propensity score and matching methods. Second Causal Inference and Big Data Summer Institute: Philadelphia, PA, June 2018.
3. Introduction to causal inference. Causal Inference and Pharmacoepidemiology Summer Institute: Piscataway, NJ, July 2019.

Invited Conference Presentations

1. Causal approaches to cost and cost-effectiveness analysis with time-dependent treatment regimes. ENAR: Atlanta, GA, March 2018.
2. Approaches to cost-effectiveness analysis based on individual monetary benefit. ENAR: Philadelphia, PA, March 2019.
3. Population-level cost-effectiveness analysis: The individual net benefit from a causal perspective. Third International Conference on Econometrics and Statistics: Taichung, Taiwan, June 2019.
4. Comment on Penalized Spline of Propensity Methods for Treatment by Zhou, Elliott, and Little. JSM: Denver, CO, July 2019.

Seminars

1. Flexible modeling of biomarker associations in the presence of endogenous treatment. Collaborative Health Studies Coordinating Center. Seattle, WA, March 2015.

2. Extending Heckman's treatment effects model to allow heterogeneity in the effects of medication use. FDA Center for Drug Evaluation and Research. White Oak, MD, September 2015.
3. Understanding natural history in the presence of endogenous medication use. Weill Cornell Medical College Division of Biostatistics and Epidemiology. New York, NY, January 2016.
4. Accounting for endogenous medication use when estimating natural biomarker associations using observational data. Stanford Medicine Quantitative Sciences Unit. Palo Alto, CA, March 2016.
5. Recovering natural history: Modeling biomarker age trends in the presence of endogenous medication use. University of Pennsylvania Division of Biostatistics. Philadelphia, PA, October 2016.
6. The nested g-formula: A causal approach to analysis of medical cost data in the presence of censoring. University of Washington, Collaborative Health Studies Coordinating Center. Seattle, WA, May 2017.
7. Analyzing medical cost outcomes with time-dependent treatment. New York University Department of Population Health. New York, NY, October 2017.
8. The nested g-formula: A causal approach for analyzing medical cost outcomes. New York University Division of Biostatistics. New York, NY, January 2018.
9. The nested g-formula: A causal approach for analyzing medical cost outcomes. University of Pennsylvania Division of Biostatistics. Philadelphia, PA, January 2018.
10. The nested g-formula: A causal approach for analyzing medical cost outcomes. University of British Columbia Department of Statistics. Vancouver, BC, January 2018.
11. Analyzing medical cost outcomes with time-dependent treatment. British Columbia Children's Hospital Research Institute. Vancouver, BC, January 2018.
12. The nested g-formula: A causal approach for analyzing medical cost outcomes. University of Utah Department of Population Health. Salt Lake City, UT, February 2018.
13. Analyzing medical cost outcomes with time-dependent treatment. Huntsman Cancer Institute. Salt Lake City, UT, February 2018.
14. Analyzing medical cost outcomes with time-dependent treatment. University of Massachusetts Amherst Department of Biostatistics. Amherst, MA, February 2018.
15. The nested g-formula: A causal approach for analyzing medical cost outcomes. Vanderbilt University Department of Biostatistics Seminar. Nashville, TN, February 2018.

16. Analyzing cost outcomes with time-varying treatment: Guidance for resource allocation and health policy decisions. Drexel University Biostatistics Seminar. Philadelphia, PA, February 2018.
17. Analyzing cost outcomes with time-varying treatment: Guidance for resource allocation and health policy decisions. State University of New York at Albany Epidemiology and Biostatistics Seminar. Albany, NY, February 2018.
18. Using observational data to aggregate evidence of clinical efficacy with information on medical costs. Vanderbilt University Medical Center Biomedical Informatics Seminar. Nashville, TN, February 2019.

Contributed Conference Presentations

1. (Oral) A comparison of methods for biomarker associations with endogenous treatment. ENAR: Baltimore, MD, March 2014.
2. (Oral) Extending Heckman's treatment effects model to allow for treatment heterogeneity. WNAR: Boise, ID, June 2015. (WNAR Most Outstanding Oral Presentation Award).
3. (Oral) Extending Heckman's treatment effects model to non-additive treatment effects. Joint Statistical Meetings: Seattle, WA, August 2015.
4. (Oral) Accounting for heterogeneity when evaluating surrogate endpoints in a discrete-time survival model. ENAR: Austin, TX, March 2016.
5. (Oral) A constrained covariance modeling approach for estimation of marginal age trends in the presence of endogenous medication use. ENAR: Washington, D.C., March 2017.
6. (Poster) A nested g-computation approach for analysis of censored medical cost data. Atlantic Causal Inference Conference: Chapel Hill, NC, May 2017. (Thomas R. Ten Have Poster Session Runner-up).
7. (Oral) A nested g-computation approach to analyze medical cost outcomes in the presence of censoring. WNAR: Santa Fe, NM, June 2017.
8. (Oral) A new direction for health policy decisions based on subgroup discovery: The cost-effectiveness determination curve. Joint Statistical Meetings: Vancouver, BC, August 2018.

STATISTICAL SOFTWARE PACKAGES (R)

- `uwIntroStats`: Emerson SS, [Spieker AJ](#), Williamson BD, Hee Wai T, Lim S. Descriptive Statistics, Inference, Regression, and Plotting in an Intro Stats. Course.
- `endogenous`: [Spieker AJ](#). Classical Simultaneous Equation Models.