RACHEL ZOE Blumhagen

National Jewish Health | 303-270-2373 | blumhagenr@njhealth.org

**EDUCATION**

University of Colorado Denver, Anshutz Medical Campus, Aurora, CO

PhD Biostatistics 2021

Topic: Methods for identification of influential variants among those identified

 in aggregate tests of association.

University of Colorado Denver, Anshutz Medical Campus, Aurora, CO

M.S. Biostatistics 2016

Thesis: “Exploring the landscape of allele-specific expression in nasal epithelium of asthmatic patients and simulating allele-specific read counts accounting for correlation”

Western Washington University, Bellingham, WA

B.S. Cell and Molecular Biology/Biochemistry 2009

Minor in Mathematics and Chemistry

**ACademic employment**

National Jewish Health, Denver, CO

Faculty Scientist 2021 – Present

Biostatistician as part of a sponsored research agreement with Eleven P15, Inc. to provide statistical support in the form of study design, data analysis and report writing. Primary focus in statistical genomics and statistical genetics such as analysis of high-throughput gene expression (single cell and bulk RNA-Seq) and rare-variant genetic data.

National Jewish Health, Denver, CO

Graduate Research Assistant 2015 – 2021

Provide statistical support in the form of study design, data analysis and report writing. Primary focus in statistical genomics and statistical genetics such as analysis of high-throughput gene expression and rare-variant genetic data. Provide project management for dozens of projects, which include laboratory and/or data analysis components in the Center for Genes, Environment and Health. Maintain project status updates in project management software system and organize investigator meetings and billing activities.

Colorado Biostatistics Consortium, Aurora, CO

Graduate Research Assistant 2013 – 2015

Provide statistical consulting which include meeting with investigators, performing data analysis and report writing.

**TEACHING EXPERIENCE**

University of Colorado Denver, Anshutz Medical Campus, Aurora, CO

Teaching Assistant for Research Methods in Epidemiology 2017

Lectured on statistical methods and applied software language (SAS and R) to aid students in final projects, met with students during office hours to provide feedback on homework and graded lab assignments.

**Primary publications**

**Blumhagen RZ,** Schwartz DA, Langefeld CD, Fingerlin TE. Identification of Influential Variants in Significant Aggregate Rare Variant Tests. Hum Hered. 2021 Feb 10;1–13.

Moore, C., **Blumhagen, R. Z.**, Yang, I. V, Walts, A., Powers, J., Walker, T., … Schwartz, D. A. (2019). Resequencing Study Confirms Host Defense and Cell Senescence Gene Variants Contribute to the Risk of Idiopathic Pulmonary Fibrosis. *American Journal of Respiratory and Critical Care Medicine*, rccm.201810-1891OC. https://doi.org/10.1164/rccm.201810-1891OC

**Blumhagen, R. Z.**, Hedin, B. R., Malcolm, K. C., Burnham, E. L., Moss, M., Abraham, E., … Alper, S. (2017). Alternative pre-mRNA splicing of Toll-like receptor signaling components in peripheral blood mononuclear cells from patients with ARDS. *American Journal of Physiology - Lung Cellular and Molecular Physiology*, *313*(5), L930–L939. https://doi.org/10.1152/ajplung.00247.2017

**Collaborative PUBLICATIONS**

Cicchini, L., **Blumhagen, R. Z.**, Westrich, J. A., Myers, M. E., Warren, C. J., Siska, C., … Pyeon, D. (2017). High-Risk Human Papillomavirus E7 Alters Host DNA Methylome and Represses HLA-E Expression in Human Keratinocytes. *Scientific Reports*, *7*(1), 1–13. https://doi.org/10.1038/s41598-017-03295-7

Chau, V. (Mimi), Stamm, C. A., Borgelt, L., Gaffaney, M., Moore, A., **Blumhagen, R. Z.**, … Gilroy, C. (2017). Barriers to Single-Dose Levonorgestrel-Only Emergency Contraception Access in Retail Pharmacies. *Women’s Health Issues*, *27*(5), 518–522. https://doi.org/10.1016/j.whi.2017.03.010

Frank, M. R., **Blumhagen, R.**, Weitzenkamp, D., Mueller, S. R., Beaty, B., Min, S., & Binswanger, I. A. (2017). Tobacco Use Among People Who Have Been in Prison: Relapse and Factors Associated with Trying to Quit. *Journal of Smoking Cessation*, *12*(02), 76–85. <https://doi.org/10.1017/jsc.2016.3>

Hauser, L. J., Gebhard, G. M., **Blumhagen, R.**, Carlson, N. E., & Cabrera‐Muffly, C. (2017). Applicant characteristics associated with successful matching into otolaryngology. *The Laryngoscope*, *127*(5), 1052–1057. https://doi.org/10.1002/lary.26236

Fingerlin, T. E., Zhang, W., Yang, I. V, Ainsworth, H. C., Russell, P. H., **Blumhagen, R. Z.**, … Langefeld, C. D. (2016). Genome-wide imputation study identifies novel HLA locus for pulmonary fibrosis and potential role for auto-immunity in fibrotic idiopathic interstitial pneumonia. *BMC Genetics*, *17*(1), 74. https://doi.org/10.1186/s12863-016-0377-2

**CONFERENCE ABSTRACTS**

American Society of Human Genetics (2020) “Identification of influential rare variants using variable importance measures from random forest methods in loci previously identified via aggregate testing”

American Society of Human Genetics (2019) “Localization of rare variants in loci previously identified in aggregate rare variant testing”

American Society of Human Genetics (2018) “Importance of protected statistical testing and replicate number in RNA-Sequencing studies”

Graybills (2017) – “Exploring the landscape of allele-specific expression in nasal epithelium of asthmatic patients and simulating allele-specific read counts accounting for correlation”

American Thoracic Society (2017) – “Evidence of recent positive selection at loci conferring risk for pulmonary fibrosis”

**AWARDS**

Strother Walker Travel Award **2017; 2018**

Marvin Porter Award **2013**

 **Invited Talks**

Wake Forest University, Winston-Salem, North Carolina (April 18, 2018). Rethinking Pairwise Comparisons in RNA-Sequencing Studies

**MEMBERSHIPS**

American Statistical Association

American Society of Human Genetics