Alison M. **Rector**

RESEARCH ASSISTANT AND PH.D. CANDIDATE - BIOSTATISTICS AND DATA SCIENCE

Buda, TX

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As a Ph.D. candidate with expertise in Biostatistics and Data Science, I have a strong ability to adapt and learn in a variety of settings to streamline data analysis and reporting. I have over 6 years of experience in statistical and data analysis. I enjoy working independently and collaborating with colleagues to troubleshoot and resolve complex issues with research, design, and implementation that propel projects to fruition.

Core Competencies

• Statistical Analysis • Spatio-temporal Models • Predictive Modeling • Advanced Data Visualization • Model Evaluation • Data Management • EHR Data • • R • RStudio • Git • GitHub • Python • SQL • PostgreSQL • INLA • SAS • Stata •

• Strategic Planning • Technical Leadership • Communication • Adaptability • Ability to Learn • Dissemination of Knowledge •

Education

University of Texas Health Science Center at Houston - School of Public Health — *Houston, TX*

PhD Candidate in Biostatistics and Data Science (Expected completion January 2023) — *August 2018 - Present*

University of Texas Health Science Center at Houston - School of Public Health — *Houston, TX*

Certificate in Advanced Data Science — *December 2021*

Sam Houston State University — *Huntsville, TX*

Master of Science in Statistics — *May 2015*

Southwestern University — *Georgetown, TX*

Bachelor of Arts, Psychology and Spanish — *May 2006*

Selected Graduate Coursework

full transcript available upon request

• Machine Learning in Practice • Practical Python Programming/Algorithms and Data Analysis • Fundamentals of Data Analytics and Prediction • • Linear Models • Generalized Linear Models • Stochastic Processes for Biostatisticians • Spatio-Temporal Analysis •

Selected Research Experience

Research Assistant

Houston, TX

Baylor College of Medicine — *Jan. 2021 - Present*

- Identified susceptible windows of exposure to environmental pollution on birth outcomes, cognitive outcomes, and behavioral outcomes by fitting Distributed Lag Non-linear models
- Mitigated impact of missing data and loss-to-follow up with multiple imputation (MI) and inverse probability weighting (IPW)
- Drafted written reports of statistical methodology for use in scientific manuscripts
- Cleaned, merged, analyzed data; summarized and visualized data and statistical model results
- Wrote and deployed PBS scripts for running analyses and data processing on a Linux cluster

Graduate Research Assistant

Houston, TX

University of Texas Health Science Center at Houston - School of Public Health — *Jan. 2019 - Present*

- Successfully managed workflow from the following research projects simultaneously, each with distinct reporting deadlines, unique study design and data constructs

Trauma Informed Care (Jan. 2020 - Present)

- Developed and implemented statistical analysis plan for multi-cohort stepped wedge design research project related to a health care initiative across multiple health care centers in Texas
- Transformed and merged datasets to prepare for multipurpose analyses; including electronic health records (EHR) data, survey data, assessment data, and demographic data
- Collaborated with medical professionals to form a plan of analysis and data visualization that is meaningful for clinical professionals

Houston Health Department & Harris County Public Health (Aug. 2020 - Feb. 2021)

- Created version control repository for cleaning, recoding, summarizing, and visualizing large datasets related to COVID-19 testing, hospitalization, and immunization in greater Houston area
- Built predictive models of COVID-19 related ICU bed usage within Trauma Service Areas of Texas
- Contributed key figures and analyses to weekly reports and presentations related to COVID-19 in Harris County, City of Houston, and surrounding areas

ONES/INMA (June 2019 - Dec. 2020)

- Identified susceptible windows of exposure to environmental pollution on birth outcomes, cognitive outcomes, and behavioral outcomes by fitting Distributed Lag Non-linear models
- Mitigated impact of missing data and loss-to-follow up with multiple imputation (MI) and inverse probability weighting (IPW)
- Cleaned, merged, analyzed data; summarized and visualized data and statistical model results

Volunteer Research Assistant (May 2020 - Sept. 2020)
- Collaboratively developed and deployed publicly available dashboard of COVID-19 data in Texas, found at TexasPandemic.org
- Modeled real time and predictions for transmission rate (R(t)), new daily COVID-19 cases, and COVID-19 hospitalizations
- Merge code updates in a repository on a version control system with multiple code contributors

Graduate Teaching Assistant (Aug 2019 - May 2020)
- Performed duties of graduate teaching assistant for Applied Linear Regression Course, including: grading, office hours, and attending lectures
- Established grading rubric to streamline grading process and clarify assignment objectives for students
- Led lectures when instructor was unavailable

Curriculum Development (Jan. 2019 - Aug. 2019)
- Collaborated with a team to develop standard curriculum for PH1700 Intermediate Biostatistics
- Consulted with lead faculty members about course content and pedagogy
- Revised instructional material, including presentation material and supplemental Stata code

Dissertation: Distributed Lag Non-Linear Models - Advised by Dr. Michael D. Swartz *Houston, TX*

University of Texas Health Science Center at Houston - School of Public Health *Aug. 2019 - Present*
- Developed a mediation analysis method for application in a Distributed Lag Non-linear Model (DLNM) Framework
- Developed a Bayesian curve-fitting method for specifying parameters of the cross-basis in a Distributed Lag Non-linear Model (DLNM)
- Identified sensitive windows of exposure to fine particulate matter on the risk of COVID-19 in a retrospective observational study by applying a Distributed Lag Non-linear Model (DLNM)

Practicum: Ranged Major Axis Regression - Advised by Dr. Melinda Holt *Huntsville, TX*

Sam Houston State University *August 2014 - May 2015*
- Authored a practicum evaluating the impact of planted outliers on average confidence interval lengths and coverage rates in a comparative performance of several Model II regression techniques
- Compared performance of RMA bootstrap interval, parametric RMA interval, parametric SMA interval and asymptotic OLS-bisector interval
- Presented results at COTS conference in Austin, TX Spring 2015

Selected Work Experience

Alipax Tutoring Services *Buda, TX*

Private Tutor *Jan 2002 - Present*
- Customized instructions to meet the needs of individual student; delivered effective virtual individual and small group instructional sessions.

Sam Houston State University *Huntsville, TX*

Lecturer *Aug. 2018 - Dec. 2018*
- Refined and implemented instruction for the courses Introduction to Statistics and Elementary Statistics.

Conroe Independent School District - Oak Ridge High School *Conroe, TX*

High School Math Teacher *Aug. 2017 - July 2018*
- Collaborated with Geometry team to generate instruction plan, calendar, and assessments for all Geometry students and delivered instruction and assessments to Geometry Students

Brazosport Independent School District - Brazosport High School *Freeport, TX*

High School Math Teacher *Aug. 2016 - July 2017*
- Taught Geometry, PreAP Geometry and Algebra students and collaborated with math instructors to improve and implement instructional material.

Aon *The Woodlands, TX*

Pension Specialist *May 2015 - Aug. 2016*
- Developed independent automated algorithm for calculating pension benefits, tested pension participant data for reliability and accuracy, and communicated benefit information to pension participants.

Publications and Presentations

Rector, A., Whitworth, K. W., Iñiguez, C., Chauhan, S., Guxens, M., Ibarluzea, J., Ish, J., Symanski, E., Swartz, M. D. (2021). Knot placement in the Distributed Lag Nonlinear Models framework. In: *33rd Annual Conference of the International Society for Environmental Epidemiology*

Whitworth, K. W., **Rector, A.**, Ish, J., Chauhan, S., Ibarluzea, J., Guxens, M., Swartz, M. D., Symanski, E., & Iñiguez, C. (2022). Identifying Sensitive Windows of Exposure to NO2 and Fetal Growth Trajectories in a Spanish Birth Cohort. Epidemiology (Cambridge, Mass.), 33(3), 318–324. https://doi.org/10.1097/EDE.0000000000001468

Yamal, J. M., Appana, S., Wang, M., Leon-Novelo, L., Bakota, E., Ye, Y., Sharma, S., Morrison, A. C., Marko, D., Linder, S. H., **Rector, A.**, Jetelina, K. K., Boerwinkle, E., & de Oliveira Otto, M. (2022). Trends and Correlates of Breakthrough Infections With SARS-CoV-2. Frontiers in public health, 10, 856532. https://doi.org/10.3389/fpubh.2022.856532

Tortolero, G. A., Otto, M. O., Ramphul, R., Yamal, J. M., **Rector, A.**, Brown, M., Peskin, M. F., Mofleh, D., & Boerwinkle, E. (2022). Examining Social Vulnerability and the Association With COVID-19 Incidence in Harris County, Texas. Frontiers in public health, 9, 798085. https://doi.org/10.3389/fpubh.2021.798085

Manuscripts in Progress

Otto, M.O., Brito, F., Tark, J.Y., Bakota, E., Yamal, J.M., Serbo, D., Sharma, S., Brown, M., Appana, S., **Rector, A.**, Case Growth Analysis to Inform Local Response to COVID-19 Epidemic in a Diverse U.S Community, *Scientific Reports* [Accepted Sept. 2022]

Chen, W., **Rector, A.**, Guxens, M., Iñiguez, C., Swartz, M. D., Symanski, E., Ibarluzea, J., and Ambròs, A., Estarlich, M., Lertxundi, A., Riaño-Galán, I., Sunyer, J., Fernández-Somoano, A., Chauhan, S.P.J., Ish, J. & Whitworth, K.W. Susceptible windows of exposure to fine particulate matter exposure and fetal growth trajectories in the Spanish INMA (INfancia y Medio Ambiente) birth cohort, *Environmental Research* [Submitted August 2022].

Rector, A., Swartz, M. D., Iñiguez, C., Guxens, M., Ibarluzea, J., Symanski,E., Delclos, G., Bauer, C.X., & Whitworth, K.W. Mediation Analysis in a Distributed Lag Non-Linear Model Framework. [In Progress]

Rector, A., Whitworth, K.W., Bauer, C.X., Iñiguez, C., Guxens, M., Ibarluzea, J., Symanski,E., Delclos, G., & Swartz, M. D. Bayesian curve-fitting for the cross basis in the Distributed Lag Non-Linear Model Framework. [In Progress]

Rector, A., Swartz, M. D., Yamal, J.M., Otto, M.O., Marko, D., Banerjee, D., Monroy, J.A., White, R., Linder, S., Delclos, G., Bauer, C.X., & Whitworth, K.W. Susceptible windows of exposure to fine particulate matter exposure and COVID-19 in Houston, TX. [In Progress]

Rector, A., Brito, F., Chen, J. Bauer, C.X., Yamal, J.M. Texas TSA COVID-19 ICU Bed Occupancy Predictive Modeling Performance Evaluation. [In Progress]

Acknowledgements

This CV was created using R version 4.2.1 with RStudio and adapted style documents from the R package *vitae*. Associated code can be found in my github repository (github.com/rectora42/AMR-ReferenceCode/tree/master/00-AMR-CV).

References available upon request