# 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 • Scala •

• 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***