KEVIN DONOVAN

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PROFESSIONAL SUMMARY

More than five years of experience in academic settings leading statistical analyses resulting in published research in top-tier scientific journals. Research included statistical methods development with applications in infectious disease, Alzheimer's, and multiple sclerosis, as well as cross-disciplinary work in Autism Spectrum Disorder and HIV studies. Experience working in collaborative environments and communicating statistics to members of the broad scientific community.

EDUCATION

University of North Carolina at Chapel Hill *August 2015 - August 2021*
PhD in Biostatistics
Department of Biostatistics

Syracuse University *January 2013 - May 2015*
B.S. in Mathematics GPA: 3.962
B.S. with Distinction in Economics

EXPERIENCE

Postdoctoral Fellow *September 2021 - Present*
University of Pennsylvania

- Development of machine learning algorithm using support vector regression to remove multivariate relationship between a confounder and set of predictor variables. Applied to medical imaging data in the context of Alzheimer's disease.

- Development of analysis pipeline to automatically detect lesion incidence in multiple sclerosis patients using low-resolution medical images.

- Lead statistical analyses on two projects with researchers in Radiology. First project published with second project under revision.

Instructor *August 2021 - October 2021*
EPID 5260: Biostatistics for Epidemiologic Methods I

- Instructor for second half of graduate level course serving as introduction to the application of biostatistical methods. Students were generally medical fellows of varied backgrounds and experience levels.

Instructor *January 2021 - May 2021*
BIOS 635: Introduction to Machine Learning

- Instructor for graduate-level course serving as introduction to machine learning methods, including statistical theory and computational application with real data. Students were cross-discipline, including statistics, computer science, and public health.

Research Assistant *March 2018 - Present*
Carolina Institute for Developmental Disabilities

- Development of algorithms for early prediction of Autism Spectrum Disorder (ASD) using behavioral data and imaging data, with random forests, support vector machines, and deep learning methods using R and Python. Prediction algorithm using behavioral data published.

- Analysis focused on examining causes of ASD prevalence and symptom heterogeneity by infant sex, using latent variable models such as factor analysis and growth mixture models and clustering methods. Resulted in multiple publications.

- Development of a set of tutorials detailing the use of R for data management and data analysis. Course based on these tutorials created with bi-weekly virtual sessions held and corresponding office hours. All made freely available online for public.

- Direct collaboration with scientists writing statistical analysis and results sections in published manuscripts, and conducting analyses in R. Methods used include generalized linear models, mixed models with longitudinal data, mediation models, and clustering algorithms. Resulted in multiple publications, with analysis code publicly available.

Teaching Assistant *August 2017 - December 2017*
BIOS 600: Principles of Statistical Inference

- Teaching assistant for introductory statistics class for non-biostatistics public health graduate students. Organized and ran lab sessions using R.

Research Assistant *September 2016 - May 2019*
Collaborative Studies Coordinating Center

- Under direction of mentor, lead statistical analyses for published research on HIV-positive youth, collaborating with investigators across the United States.

- Development of R package **lodr** to conduct regression analyses when predictors have a known limit of detection. Package made publicly available on CRAN.

Research Assistant *August 2015 - March 2018*
University of North Carolina at Chapel Hill

- Developed and published research on methodology for estimating biomarker levels which correspond to a desired upper bound on the risk of disease.

SKILLS

Computing: R, SAS, C++, Matlab, Python, Linux cluster
Image processing: FSL, ANTS, ITK-Snap

DEVELOPED SOFTWARE

1. **Donovan, K.,** Psioda, M., Hudgens, M. & Loop, M. R Package. **lodr**: Regression with biomarkers subject to limit of detection. 2020. `https://cran.r-project.org/web/packages/lodr/index.html`.

PUBLICATIONS

Published

1. **Donovan, K.,** Hudgens, M. & Gilbert, P. Nonparametric inference for immune response thresholds of risk in vaccine studies. *The Annals of Applied Statistics* **13,** 1147–1165 (2019).
2. Du Pisanie, J., Abumoussa, A., **Donovan, K.,** Stewart, J., Bagla, S. & Isaacson, A. Predictors of Prostatic Artery Embolization Technical Outcomes: Patient and Procedural Factors. *Journal of Vascular and Interventional Radiology* **30,** 233–240 (2019).
3. Kim-Chang, J. J., **Donovan, K.,** Loop, M. S., Hong, S., Fischer, B., Venturi, G., Garvie, P. A., Kohn, J., Rendina, H. J., Woods, S. P., *et al.* Higher soluble CD14 levels are associated with lower visuospatial memory performance in youth with HIV. *AIDS* **33,** 2363–2374 (2019).

4. Swanson, M. R., **Donovan, K.,** Paterson, S., Wolff, J. J., Parish-Morris, J., Meera, S. S., Watson, L. R., Estes, A. M., Marrus, N., Elison, J. T., *et al.* Early language exposure supports later language skills in infants with and without autism. *Autism Research* **12,** 1784–1795 (2019).
5. Grzadzinski, R., **Donovan, K.,** Truong, K., Nowell, S., Lee, H., Sideris, J., Turner-Brown, L., Baranek, G. T. & Watson, L. R. Sensory Reactivity at 1 and 2 Years Old is Associated with ASD Severity During the Preschool Years. *Journal of Autism and Developmental Disorders,* 1–10 (2020).
6. Meera, S. S., **Donovan, K.,** Wolf, J., Zwaigenbaum, L., Elison, J., Truong, K. & Pivon, J. Towards a Data Driven Approach to Screen for Autism Risk at 12 Months of Age. *Journal of the American Academy of Child and Adolescent Psychiatry* (2020).
7. Girault, J. B., **Donovan, K.,** Hawks, Z., Talovic, M., Forsen, E., Elison, J. T., Shen, M. D., Swanson, M. R., Wolff, J. J., Kim, S. H., *et al.* Infant visual brain development and inherited genetic liability in autism. *American Journal of Psychiatry* **179,** 573–585 (2022).
8. Burrows, C. A., Grzadzinski, R. L., **Donovan, K.,** Stallworthy, I. C., Rutsohn, J., John, T. S., Marrus, N., Parish-Morris, J., MacIntyre, L., Hampton, J., *et al.* A data-driven approach in an unbiased sample reveals equivalent sex ratio of autism spectrum disorder–associated impairment in early childhood. *Biological Psychiatry* **92,** 654–662 (2022).
9. Grzadzinski, R., Jatkar, A., **Donovan, K.,** Truong, K., Holbrook, A., Lord, C. & Kim, S. H. Examining Treatment Outcomes Across Contexts: How Do Child Baseline Characteristics Impact Measurement of Treatment Response? *Journal of Autism and Developmental Disorders,* 1–11 (2022).
10. Shapira, N., **Donovan, K.,** Mei, K., Geagan, M., Roshkovan, L., Gang, G. J., Abed, M., Linna, N. B., Cranston, C. P., O'Leary, C. N., *et al.* Three-dimensional printing of patient-specific computed tomography lung phantoms: a reader study. *PNAS Nexus* **2** (2023).

In Progress

11. **Donovan, K.,** Tustison, N. J., Linn, K. A. & Shinohara, R. T. Multivariate Residualization in Medical Imaging Analysis. *bioRxiv,* 2023–02 (2023).
12. **Donovan, K.,** Arnold, T. C., Manning, A. R., Chen, L., Clark, A. K., Schindler, M. K., Shinohara, R. T. & Sweeney, E. M. Automated Detection of Longitudinal Lesion Activity using Low-Field Imaging in Multiple Sclerosis (2023).
13. Emmert, B., Gandelman, S., Do, D., **Donovan, K.** & Schindler, M. A Characterization of Neurology Consults for Inpatients with SARS-CoV-2 Infection as Compared to Other Respiratory Viruses (2023).

PROFESSIONAL PRESENTATIONS

1. Statistical Methods for Adolescent HIV Trials. Contributed Session. Joint Statistical Meeting 2020. Philadelphia, PA. (2020).
2. Multivariate Residualization in Medical Imaging Analysis. Contributed Session. Joint Statistical Meeting 2022. Washington, D.C. (2022).

REFERENCES

Available upon request