Dr. Nathan Ryder

EDUCATION

Doctor of Philosophy in Statistics 2023
Colorado State University, Fort Collins, CO Advisor: Dr. Kayleigh Keller

Master of Science in Statistics 2022
Colorado State University, Fort Collins, CO Advisor: Dr. Kayleigh Keller

Bachelor of Arts in Mathematics with Minors in Statistics and Chemistry 2017
Dordt College, Sioux Center, IA

EXPERIENCE

Associate Scientist at Fatty Acid Research Institute August 2023 – Present

- Collaborate in interdisciplinary research, advancing the understanding of fatty acids and health
- Harmonize and clean biobank data, then apply or develop statistical models for multi-cohort analyses
- Draft sections and create tables, graphs, and other visualizations for published research

Data Scientist at Aquora Research LLC August 2023 – Present

- Coordinate with long-term care facilities and aide organizations to collect survey and medical record data
- Analyze, predict, and visualize data for information-based services
- Participate in a small organization to develop products, discern a target market, and establish returns on investment

Scientific Consultant at University of Illinois Chicago May 2024 – Present

- Clean and combine GPS, actigraph, and survey data to study relationships of activity space and health
- Coordinate meetings, present results, and assign tasks within the data analysis team
- Harmonize data on cognitive decline with lifestyle interventions from 12 randomized controlled trials

GRANT ACTIVITY

Developing a blood fatty acid-based algorithm as an early predictor of insulin resistance: Applying machine learning to harmonized data from prospective cohort studies
Role: Statistician (PI: Kristina Jackson) Omegaquant Analytics, LLC
NIH/NIDDKD 1R43DK136409-01 Total Award: $327,420 May 2023 – May 2025

Developing a blood fatty acid-based algorithm as an early predictor of dementia: Applying machine learning to harmonized data from prospective cohort studies
Role: Statistician (PI: William Harris) Omegaquant Analytics, LLC
NIH/NIA 1R41AG085816-01 Total Award: $506,500 December 2023 – November 2025

Novel methods to improve the utility of genomics summary statistics
Role: Statistician (PI: Nathan Tintle) Fatty Acid Research Institute
NIH/NHGRI R21HG012998 Total Award: $427,075 August 2023 – September 2025

MANUSCRIPTS IN PREPARATION

Ryder, N. A., Westra, J., Sala-Vila, A., Wolf, J., Harris, W. S., & Tintle, N. L. (Expected Submission 2025). Quantifying the differential relationship between red blood cell DHA and cognition based on APOE-e4

carriership across multiple cohorts: illustration of a novel statistical approach.

Lázaro, I., Luján-Barroso, L., Soldevila-Domenech, N., Amor, A. J., Ortega, E., Ros, E., María-José, S, Rodríguez-Barranco, M., Dolores Chirlaque, M., Maria Huerta, J., Guevara, M., Moreno-Iribas, C., Bonet, C., Schroder, H., Fitó, M., Tintle, N. L., **Ryder, N.**, Harris, W. S., Agudo, A., & Sala-Vila, A. (Expected Submission 2025). Development of a blood-based lipidomic fat quality score for the risk of ischemic stroke.

Sala-Vila, A., Smith, C. E., Tintle, N. L., Manichaikul, A., Tang, W., Lemaitre, R. N., Cuenca-Royo, A., Lázaro, I., **Ryder, N.**, Wood, A. C., Fitzpatrick, A., Ida Chen, Y., Rich, S. S., Steffen, L. M., Mosley, T., Jensen, P. N., Lopez, O. L., Longstreth, W., Psaty, B. M., Tsai, M. Y., Mozaffarian, D., & Harris, W. S. (Expected Submission 2025). Potential interactions among blood docosahexaenoic acid, executive functions and burden of immune-related genetic variants: a prospectively designed meta-analysis in five US cohorts.

——— PEER-REVIEWED PUBLICATIONS ———

Jawad MA, O'Keefe JH, Tintle N, O'Keefe EL, Franco WG, Djousse L, **Ryder N**, & Harris WS. (2024). Association of Plasma Omega-3 Levels With Incident Heart Failure and Related Mortalities. *Mayo Clinic Proceedings*. 99(12), 1895-1904.

Ryder, N. A., & Keller, J. P. (2022). Spatiotemporal Exposure Prediction with Penalized Regression. *Journal of Agricultural, Biological and Environmental Statistics*.

Keller, J. P., Dunlop, J. H., **Ryder, N. A.**, Peng, R. D., & Keet, C. A. (2022). Long-Term Ambient Air Pollution and Childhood Eczema in the United States. *Environmental Health Perspectives*, 130(5), 057702.

Wolf, J. M., Barnard, M., Xia, X., **Ryder, N.**, Westra, J., & Tintle, N. (2020). Computationally efficient, exact, covariate-adjusted genetic principal component analysis by leveraging individual marker summary statistics from large biobanks. *Pacific Symposium on Biocomputing*, 25, 719–730.

Ryder, N., Dorn, K. M., Huitsing, M., Adams, M., Ploegstra, J., DeHaan, L., Larson, S., & Tintle, N. L. (2018). Transcriptome assembly and annotation of johnsongrass (Sorghum halepense) rhizomes identify candidate rhizome-specific genes. *Plant Direct*, 2(6), e00065.

Vander Woude, J., Huisman, J., Vander Berg, L., Veenstra, J., Bos, A., Kalsbeek, A., Koster, K., **Ryder, N.**, & Tintle, N. L. (2018). Evaluating the performance of gene-based tests of genetic association when testing for association between methylation and change in triglyceride levels at GAW20. *BMC Proceedings*, 12(Suppl 9), 50.

Veenstra, J., Kalsbeek, A., Koster, K., **Ryder, N.**, Bos, A., Huisman, J., VanderBerg, L., Vander Woude, J., & Tintle, N. L. (2018). Epigenome wide association study of SNP-CpG interactions on changes in triglyceride levels after pharmaceutical intervention: A GAW20 analysis. *BMC Proceedings*, 12(Suppl 9), 58.

——— DISSERTATION ———

Spatiotemporal Exposure Prediction with Penalized Regression

To analyze the relationship between ambient air pollution and health, an accurate estimate of exposure is required across space and time. We introduce a model penalized against overfitting and for smoothness across consectutive timepoints, which is faster and competitively accurate with spatial-only and spatiotemporal universal kriging methods.

Principal Stratification Methods for "At-the-Time" Effects from Longitudinal Studies

Accurately estimating the effect of experimental intervention can be complicated by not all subjects receiving their assigned treatments. Principal stratification aims to instead find an average causal effect for subjects which "comply" with their assigned treatment. We extend existing principal scores and bayesian

principal stratification methods to a longitudinal case with changing assignment.

Ryder N. (2023). Methodology in Air Pollution Epidemiology for Large-Scale Exposure Prediction and Environmental Trials with Non-Compliance. *Colorado State University ProQuest Dissertations & Theses*.

PRESENTATIONS

Spatiotemporal Exposure Prediction with Penalized Regression February 2023
International Biometric Society Journal Club (Online)

Predicting a Spatiotemporal Exposure Surface with Penalized Regression August 2021
Joint Statistical Meetings (Online)
SPEED Session: Analyses in Ecology, Epidemiology, and Environmental Policy

Imputation methods, phenotypic uncertainty and implications on plant genetic databases July 2018
University of Michigan
Dordt College Biostatistics Summer Research Presentations

Associating Phenotypic Distributions with Genotypes in Wheat June 2017
Iowa State University
Dordt College Biostatistics Summer Research Presentations

Bioinformatic and in vitro experimentation to identify genes associated with perenniality in Thinopyrum intermedium July 2015
Dordt College
Summer Seminar Series

RESEARCH EXPERIENCES

Epidemiology in Weather-Related Pregnancy Risk September 2022 – May 2023
Colorado State University, Fort Collins, CO Dr. Andreas Neophytou, Dr. Kayleigh Keller

- Survival analysis of preterm birth risk and hurricane exposure using distributed lag non-linear models
- Bringing together North Carolina births (∼2.5 million), modeled wind speeds, and county flood events
- Pipelining models on computer cluster due to large dataset and amount of possible relationships to fit

Biostatistics in Plant Genetics January 2017 – August 2018
Dordt College, Sioux Center, IA Dr. Nathan Tintle, Dr. Jesse Poland

- Wrote paper on rhizome RNA that we extracted, submitted for sequencing, assembled, and annotated
- Used R on computer cluster to perform multivariate analysis of plant phenotypic distributions
- Presented with coresearcher to faculty at Iowa State University

Bioinformatics in Plant Genetics September 2014 – September 2015
Dordt College, Sioux Center, IA Dr. Nathan Tintle

- Identified genes linked to perenniality in Intermediate Wheatgrass and likely ancestors
- Set up a BLAST comparative genomics pipeline locally and on an offsite computer cluster
- Presented with co-researcher to faculty at Dordt College and University of Michigan

Atmospheric Chemistry of Exoplanets August 2014 – November 2014
Dordt College, Sioux Center, IA Dr. Channon Visscher

- Mapped chemical behavior of the atmosphere on exoplanet Gliese 570D
- Prepared inputs for NASA's CEA to calculate the equilibriums of chemical species
- Graphed outputs with FORTRAN and made visual edits in Inkscape

TEACHING EXPERIENCE

Graduate Teaching Assistant September 2018 – May 2022
Colorado State University Statistics Department, Fort Collins, CO Dr. Aaron Nielsen

- Lectured or taught recitations for introductory Statistics courses 201, 301, and 315

- During Covid-19 pandemic administered online courses and identified/documented Chegg cheating
- Won the 2022 CSU Statistics Department Boes Award for Excellence in Teaching

Adjunct Instructor September 2017 – May 2018
Dordt College Chemistry and Mathematics Departments, Sioux Center, IA
- Instructed three weekly laboratory periods for General Chemistry and Chemistry for Engineers
- Answered questions in flipped classroom for two sections of Calculus I and II

Tutor/Teacher's Assistant September 2014 – May 2017
Dordt College Academic Enrichment Center, Sioux Center IA
- Proofread papers and tutored for courses in Mathematics, Statistics, and Chemistry
- Assisted laboratory periods and graded lab results, notebooks, and written reports

SKILLS

R/Rmarkdown · LaTeX · GNU Emacs · Linux

HONORS

Boes Award for Excellence in Teaching 2022
Finalist, 2021 Stanford Open Datathon
3rd place, USCLAP 2014 (Second Course in Statistics Subcategory)
Dordt College Distinguished Scholar Award
Dordt College Presidential Scholarship
Norm and Val Duininck Scholarship for Mathematics
Off-Campus Cross Cultural Experience Scholarship
Theatre Arts Activity Scholarship
Vocal Music Activity Scholarship