Nicholas, Spyrison, Ph.D.

Biostatistician

Data Vis | Model Interpretation

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Career Summary

A published data scientist with years of experience in hypothesis testing, experimental design, enterprise-level reporting, and machine learning on a diverse range of data. Conducted end-to-end development on multiple R packages delivering open-source solutions to the community. Nicholas frequently acts as a mentor in sharing best practices with the team resulting in continuous improvement, performance code, and increased project completion.

Employment History

03/2023 – Present **Biostatistcian**, *IFF – Internation Flavors and Fragrances*, Madison, WI.
- Produced, maintain, and interpret >600 decay models of probiotic stability informing pricing at a plant averageing $390 Million net annual sales
- Statistical modeling, interpretation, and data visualization consulting for >300 employees on-site

06/2022 – 01/2023 **Research Data Scientist**, *University of Queensland*, Clayton, VIC, Australia.
- Delivered batteries of models varying cohorts, model formulas, and hyperparameters tuning on patient-level health data

07/2018 – 10/2022 **Research Officer**, *Monash University*, Clayton, VIC, Australia.
- *Data Fluency Instructor*: Lead workshops (10-30 people) on statistical modeling, R, Python, PowerBI, and Git
- *Teaching Assistant*: Post-grad tutorials on high-dimensional data analysis, post-grad data visualization, and undergrad economic statistics
- *Research Officer*: Extract, transform, load, and analysis of census and text data

12/2016 – 1/2018 **Business Intelligence Developer**, *CPI Card Group*, Denver, CO.
- SQL reporting; across 4 reporting platforms and 4 servers
- Mentor junior teammates and improve query performance
- Triage and transfer 30+ legacy reports to modern reporting solution
- Developed supply chain report tracking a cost reduction of more than $4 Million USD

07/2015 – 10/2016 **Business Intelligence Developer**, *UDR Real Estate Investment Trust*, Denver, CO.
- Transition enterprise reporting from WebFOCUS to SSRS – 10+ reports

11/2014 – 04/2015 **Business Intelligence Analyst**, *Heartland Financial USA*, Dubuque, IA.
- Financial reporting for internal and external audiences

02/2013 – 05/2014 **Delivery Analyst**, *IBM – International Business Machines*, Dubuque, IA.
- Automated ETL with VBA macros for about 0.5 FTE savings across the team
- KPI reporting to teams and management

01/2010 – 08/2012 **Laboratory Technician**, *The Ames Laboratory & Iowa State University*, Ames, IA.

Authored Software (R Packages)

09/2022 **cheem** – Novel analysis and interactive visual for exploring ML interpretability *Link*

10/2020 **spinifex** – ggplot2-like API for composing and exporting animated projections *Link*

Education

02/2018 – 06/2022 **Ph.D. Information Technology & Statistics**, *Monash University*, Clayton, VIC,
Dimension reduction, interactive and animated data visualization, machine learning
Thesis: *Interactive and Dynamic Visualization of High-dimensional Data*.

- Novel interoperability visualization methods for **Fit random forest models on several contemporary datasets** also shown to generalize to other models with **SVM and XGboost**
- Utilized **SHAP and LIME local explanations** to explore local linear variable importance to understand large residuals in the models
- Created **novel interactive animation** facilitating this exploration in a web app
- **Authored R packages** on CRAN as free and open source work to improve reproducibility and contribute back to the community

08/2008 – 05/2012 **B.Sc. Statistics**, *Iowa State University*, minors in Physics and Mathematics, Ames, IA.

Technical Skills

Programs R, SQL, Python, Git, GitHub, LaTeX, Excel, VBA

Packages ggplot2, tidyverse, plotly, shiny, tidymodels, caret, keras, pandas, scikit-learn

Reporting SSRS, Tableau, PowerBI, Rmarkdown, Shiny

Awards and Honors

06/2022 Invited article for INFORM's OR/MS Tomorrow *Link*

04/2022 RStudio: March "Top 40" New CRAN Packages *Link*

05/2022 Monash Postgraduate Publication Award

10/2020 Melbourne Datathon 2020 – **1st place of several hundred entries** *Link*

- *Changes to Victorian Intraday Electricity Demand Following COVID-19 Restrictions*

11/2018 ACEMS Impact and Engagement Award

07/2018 UseR2018 Datathon – 3rd place

- Spatio temporal animated visualization of over 7 million avian sightings

2018 – 2022 Faculty Graduate Research Scholarship

2018 – 2022 Co-funded Monash Graduate Scholarship

05/2012 Nominated for Student Employee of the Year

05/2011 Nominated for Student Employee of the Year

05/2008 American Legion Award

Publications

Doctoral Thesis

[1] Nicholas Spyrison. "Interactive and dynamic visualization of high-dimensional data". en. PhD thesis. Monash University, Mar. 2022. URL: https://github.com/nspyrison/thesis_ns/blob/master/docs/thesis_ns.pdf.

Journal Articles

[2] Anatoliy Gavrylov et al. "Association of Country Income Level With the Characteristics and Outcomes of Critically Ill Patients Hospitalized With Acute Kidney Injury and COVID-19". In: (2023).

[3] Marina Wainstein et al. "Association of country income level with the characteristics and outcomes of critically ill patients hospitalized with acute kidney injury and COVID-19". In: *Kidney International Reports* (2023).

[4] Nicholas Spyrison, Dianne Cook, and Przemyslaw Biecek. "Exploring Local Explanations of Nonlinear Models Using Animated Linear Projections". In: *arXiv preprint, submitted to JMLR* (2023). DOI: 10.48550/ARXIV.2205.05359. URL: https://arxiv.org/abs/2205.05359.

[5] Nicholas Spyrison, Dianne Cook, and Kim Marriott. "A Study on a User-Controlled Radial Tour for Variable Importance in High-Dimensional Data". In: *arXiv preprint, submitted to TVCG* (Dec. 2022). arXiv:2301.00077 [stat]. DOI: 10.48550/arXiv.2301.00077. URL: http://arxiv.org/abs/2301.00077 (visited on 01/06/2023).

[6] Stuart Lee et al. "The state-of-the-art on tours for dynamic visualization of high-dimensional data". en. In: *WIREs Computational Statistics* (Dec. 2021), p. 21. ISSN: 1939-0068. DOI: 10.1002/wics.1573. URL: https://onlinelibrary.wiley.com/doi/pdf/10.1002/wics.1573 (visited on 12/10/2021).

[7] Nicholas Spyrison and Dianne Cook. "spinifex: an R Package for Creating a Manual Tour of Low-dimensional Projections of Multivariate Data". en. In: *The R Journal* 12.1 (2020), p. 243. ISSN: 2073-4859. DOI: 10.32614/RJ-2020-027. URL: https://journal.r-project.org/archive/2020/RJ-2020-027/index.html (visited on 10/16/2020).

Software (R Packages)

[8] Nicholas Spyrison. *cheem: Interactively Explore the Support of Local Explanations of a Model*. 2022. URL: https://CRAN.R-project.org/package=cheem.

[9] Nicholas Spyrison and Dianne Cook. *spinifex: Manual Tours, Manual Control of Dynamic Projections of Numeric Multivariate Data*. 2021. URL: https://CRAN.R-project.org/package=spinifex.

Conference Proceedings

[10] Nicholas Spyrison. "Animated Linear Projections". In: *Summer 2022*. INFORMS, May 2022.

[11] Dianne Cook, Stuart Lee, and Nicholas Spyrison. "A Showcase of New Methods for High Dimensional Data Viewing with Linear Projections and Sections". In: *Book of Abstracts*. International Federation of Classification Societies, 2022, p. 10.

[12] Nicholas Spyrison, Benjamin Lee, and Lonni Besançon. ""Is IEEE VIS *that* good?" On key factors in the initial assessment of manuscript and venue quality". In: *IEEE AltVis Workshop*. type: article. July 2021. DOI: 10.31219/osf.io/65wm7. URL: https://osf.io/65wm7/ (visited on 08/21/2021).

[13] Madeleine Barrow, Jieyang Chong, and Nicholas Spyrison. "Changes to Victorian Intraday Electricity Demand Following COVID-19 Restrictions". en. In: *Melbourne Datathon 2020, Insights category*. Oct. 2020, p. 4. URL: https://github.com/nspyrison/melb_datathon2020/blob/master/_paper/paper.pdf (visited on 02/09/2022).

[14] Nicholas Spyrison. "spinifex: visualizing local structure of higher dimensions". en. In: Brisbane, Australia, 2018. URL: https://user2018.r-project.org/poster/ (visited on 07/28/2020).

References available on request.