

Justin Nicholson, Ph.D. (TS/SCI)

Washington, D.C.

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Personal Profile

A University of Rochester International Relations Ph.D. with TS/SCI clearance and over 14 years of experience in data modeling, data science, and machine learning. Experienced in developing and presenting domain-based logical data models to frame analytics and drive governance solutions. Proficient in leveraging advanced data science and machine learning techniques including generative AI in Python and R to drive success in defense and intelligence contexts. Well-versed in game theory, econometrics, and statistics.

Work Experience

Intellibridge

McLean, VA

Lead Data Scientist / Interim DS Director

2024 - Present

- Led development of custom generative AI model suite to perform economic threat intelligence analysis reducing human analyst workload by factor of 4 and boosting scalability. Managing ongoing discussions with 2 new potential clients
- Overhauled science strategy to focus on testing ML efficacy and explainability, aligned with 5 project teams resulting in 2 contract extensions or mods and over 200% increase in client daily active users
- Established and monitored data science group key performance indicators resulting in reduced monthly compute costs of 77% on average
- Spearheaded data governance initiatives to boost integrity and security of our data. Made data accessible to 5 project teams across intelligence and defense clients

Sachs Capital Group Asset Management

New York, NY

Principal Data Scientist

2023 - 2024

- Spearheaded project to modernize over 75% of core data science artifacts for overall organization including all options pricing science using standard ML and custom deep neural network models developed in Python using PyTorch, Keras, and sci-kit learn increasing overall model accuracy by over 20%
- Led creation of data warehouse with 2TB of data based on Google BigQuery increasing data availability and reducing data visualization and modeling lifecycles by more than 25%
- Created suite of discriminative and generative ML models to analyze and predict behavior of exotic options markets leading to greater than \$1 million in short-term investment returns
- Created dashboards and visualizations using Python with Seaborn, Plotly and Dash

Palantir Technologies

Washington, DC

Deployment Strategist

2022 - 2023

- Led data analytics software deployment team of 4 forward deployed engineers, ML engineers, and product managers supporting Project Maven, a \$200 million/year multi-agency intelligence program, increasing team's revenue by over 52%
- Created and presented complex custom logical data models for 4+ DoD and IC customers to enable analytics, form the basis of data-governance policies, and form the blueprint for implementation of physical data models
- Structured data for special forces clients using formal ontologies based on Web Ontology Language (OWL) and Resource Description Framework (RDF), to enable machine learning capabilities based on sensor data fusion winning contract of over \$22 million
- Implemented logical data models in Palantir's software to enable further AI/ML analysis resulting in successful re-compete of 2 contracts worth over \$50 million

Booz Allen Hamilton

McLean, VA

Data Science Research Manager (Associate)

2020 - 2022

- Managed six-person SWE/data science team developing custom data analytics software for U.S. Army using mathematical and statistical methods (logit/probit models, SHAPLEY scores, etc). Briefed senior government leadership, translated mission into requirements, etc resulting in product adoption growth by over 33%
- Managed testing and evaluation of computer vision models for intelligence agency client including deployment of CI/CD data pipeline in production reducing development lifecycle by 71%
- Served as AI/ML advisor to DoD intelligence component leadership helping define mission and vision for 2 agency-wide projects resulting in successful RFP rounds with over \$40 million awarded and estimated \$3 million saved
- Conducted EDA and prototype ML modeling using sci-kit learn, XGBoost and PyTorch

Advanced Data Science Researcher (Sr. Consultant)

- Led a four-person data science team to develop GAN models in PyTorch to generate synthetic data improving accuracy of program computer vision models by over 31% while reducing bias by 17%
- Produced production-ready LSTM deep learning models in Keras and deployed with ONNX on radio frequency data and metadata to detect and classify man-made interference resulting in \$12 million contract to continue prototype
- Developed custom performance metrics to benchmark statistical and machine-learning models resulting in increased end-user adoption

University of Memphis

Memphis, TN

Data Analyst

2018 - 2019 (1 yr contract)

- Consulted for large regional non-profit client to assess effectiveness of education and public health initiatives supported by federal grants, to help win non-profit \$3 million in grants from U.S. government
- Created methodology for 6 statistical analyses of interventions by correcting self-selection, treatment, and detection bias using causal inference (propensity score matching, fuzzy RDD design)
- Conducted statistical and machine-learning analyses in Python and R using scikit-learn, PyTorch, TensorFlow/Keras, MaxLik, Optim and visualizations using ggplot2, seaborn, etc

Moody's Investors Service

New York, NY

Associate Analyst (Data Scientist)

2010 - 2012

- Developed new ratings methodology with States Ratings Group to assess and update the internal rating system of U.S. states using econometric methods
- Developed a new proprietary quantitative scoreboard model with 63 economic, financial and governance factors to improve credit policy methodology and identify emerging risk trends
- Collaborated with Senior Credit Officers to analyze credit risk and rate 300+ U.S. state debt offerings using liquidity and discounted cash flow analysis, market analysis, and risk-neutral pricing models

Graduate Research

Nuclear Proliferation and Alliance Formation

Rochester, NY

University of Rochester

2018 - 2021

- Project identifying and examining how countries use development of nuclear technology (latency) to strategically manipulate proliferation risk inducing allied foreign policy concessions
- Analyzed data using new statistical strategic model with partial observability showing that countries develop latency to credibly commit to proliferation in the future to extract defense commitments from more powerful nations in exchange for reductions in proliferation risk
- Gathered first-time historical (1948-present) longitudinal dataset of 1.5 million+ observations across 140 factors (e.g., types of nuclear energy, natural resources, industrial capacity, economics and labor, financial, and nuclear latency escalation risk)

Strategic Incentives in Counterterrorism Operations

Rochester, NY

University of Rochester

2017 - 2021

- Utilized game theory and econometric causal inference paradigms (matching, propensity scores, regression discontinuity) on dataset of 20,000+ observations showing that states become reliant on future foreign aid making it an ineffective incentive to achieve foreign policy goals
- Created new stochastic game theory model for international foreign aid and cooperation to explore incentive-compatible solutions, by applying mechanism design to divergent incentives in bargaining

Effects of Alliances on Conflict Initiation

Rochester, NY

University of Rochester

2017 - 2020

- Extensively researched the effects of alliance formation on conflict initiation against third parties
- Derived new MLE-based algorithm to correct bias from self-selection into alliances that depends on multiple interrelated strategic decisions

Publications

CONFERENCE PROCEEDINGS

Alliances in the Shadow of the Mushroom Cloud: Strategic Nuclear Latency and Extended Deterrence Relations

Justin W. Nicholson

Midwestern Political Science Association Annual Meeting, 2019, Chicago, IL

Hidden Restraint: Strategic Selection and Conflict Initiation in Alliance Relations

Justin W. Nicholson

American Political Science Association Annual Meeting, 2019, Washington, DC

State Institutions and Leader Incentives for Conflict Initiation

Justin W. Nicholson

American Political Science Association Annual Meeting, 2018, Boston, MA

Education

University of Rochester

Rochester, NY

M.A., Ph.D. in Political Science

2021

- Statistics & Machine Learning
- Formal Theory (Game Theory, Decision Theory)
- International Relations (Nuclear Policy, Causes of International Conflict)

Rutgers University, New Brunswick

New Brunswick, NJ

BA in Economics and Political Science

2010

- Graduated *Summa Cum Laude*

Skills

Programming	Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), R(tidyverse, ggplot2), \LaTeX , Git
Statistics / ML	Causal Inference, Recommender Systems, Discrete Choice Modeling (logistic regression, Multinomial logit/probit etc)
Deep Learning	ANN, Reinforcement Learning, LSTM and GRU models in Tensorflow/Keras
Project Management	Jira, Asana, Confluence, Smoke / Unit / Integration / Regression Testing, Agile

References available upon request.