

# Christopher Burch

DATA SCIENTIST AND CONSULTANT

Fredericksburg, Virginia

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## Summary

Experienced data scientist, business analyst, and team leader with ten years of experience in complex systems modeling, analysis, and simulation. I take pride in transforming data into business insight and building teams that perform as more than the sum of their parts.

## Experience

### The MITRE Corporation

#### LEAD DATA SCIENTIST

2022 - 2025

- Built systems dynamics and agent-based models to analyze complex systems across multiple domains. Utilized advanced machine learning techniques to model physical, sociological, and epidemiological systems. Developed and validated statistical and causal models to make predictions, explain drivers, and design interventions.
- Presented the findings, recommendations, and the results of complex analysis to a variety of internal and external audiences, including executive-level decision makers.
- Co-Principal Investigator (PI) for an internal research and development project focused on improving outcomes and efficiency in the US Veterans' Affairs disability awards process. Designed research, budgeted, and staffed the team. Conducted technical analysis and changed strategy when necessary based on project needs.
- Assisted with research design and coded the a comprehensive metaanalysis of Alzheimer's Disease and related dementias (ADRD), projecting expected ADRD burden at the US State and County level.
- Developed models and simulated encounters to help shipping vessels avoid striking whales in major US shipping lanes.
- Developed company-internal R visualization and data processing packages used by multiple projects across the organization.
- Build, programmed, and analyzed results of an agent-based epidemiological simulation, which led to actionable interventions to prevent the spread of disease in commercial agricultural populations.
- Trained data analysts and mentored junior data scientists in statistical techniques, complex systems modeling, simulation methods, and data analysis best practices.
- Served as the baseline epidemiology modeling expert for the DARPA Automated Scientific Knowledge Extraction and Modeling (ASKEM) evaluation team from 2023 to 2025.
- Developed survey response questions and analyzed results for multiple targeted interventions into hiring, promotion, and accommodation decisions across multiple US Federal departments.

### Grant Leading Technology

#### DATA SCIENTIST AND CONSULTANT

2018 - 2022

- Technical lead for FAA property data visualization, covering more than \$9 billion in managed property.
- Built machine learning models to analyze and predict vehicle fleet fuel use, mileage, and accident rates, resulting in improved FAA vehicle training policy.
- Wrote and maintained open-source R packages to interface with existing Federal APIs, improving FAA reporting automation and reducing errors.
- Managed development of the FAA-wide vehicle recall status tracking system, reducing outstanding vehicle recalls by 90%.
- Applied systems theory to model complex interactions between business units, and proposed workflow process improvements based on those models.
- Wrote, built, and administered rollout of a new company-wide employee evaluation system.

### Cogentis Therapeutics

#### COFOUNDER / CHIEF DATA OFFICER

2014 - 2018

- Developed financial models which reduced investor risk and controlled experimental risk for increased stability in the startup ecosystem.
- Created company data standard operating procedures (SOP), code books, and data dictionaries.
- Prepared data visualizations for company communication, publication, and grantwriting.

### US Army 20th Special Forces Group

#### ADVANCED SKILLS INSTRUCTOR

2009 - 2011

- Senior CQB/Close Combat Instructor for US Army, US Navy, and NATO forces in close quarters combat (CQB), fighting in built-up areas (FIBU), advanced urban combat (SFAUC), and advanced special operations (ASO).
- Lead a team of 5 – 10 junior instructors; responsible for subordinate instruction in firearms and small unit tactics proficiency, range preparation, and field exercise coordination.
- Developed a metrics-based training evaluation system to A/B test multiple techniques.

## US Army 10th Special Forces Group

### SPECIAL FORCES COMMUNICATIONS NCO

2004 - 2009

- Trained and advised more than 2,000 foreign military and police force personnel in patrolling, advanced urban combat, marksmanship, and mission planning.
- Participated in more than 250 named missions across Afghanistan, Africa, and Eastern Europe in support of US and NATO counterterrorism efforts.

## Technical Skills

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### Languages

R, PYTHON, JULIA, SQL, M, VBA

### Software

EXCEL, TABLEAU, GIT, LINUX, WINDOWS, SHINY

### Techniques

BAYESIAN METHODS, AGILE SOFTWARE DEVELOPMENT, CAUSAL INFERENCE

## Education

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### Massachusetts Institute of Technology

MICROMASTERS CERTIFICATE

2015-2017

- Graduate training in Data, Economics, and Developmental Policy (DEDP)

### Johns Hopkins University

MASTER OF BUSINESS ADMINISTRATION

2013-2015

- Double Specialization in Enterprise Risk Management (ERM) and Marketing

### Arizona State University

BACHELOR OF ARTS, ORGANIZATIONAL MANAGEMENT

2011-2013

- SALUTE National Honors Society

## Current Certifications

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### Data Science Specialization

JOHNS HOPKINS UNIVERSITY

### IBM Machine Learning Specialization

IBM

### Lean Six Sigma Yellow Belt

GRANT LEADING TECHNOLOGY

### Certified Risk Analyst (CRA)

GLOBAL ACADEMY OF FINANCE AND MANAGEMENT

## Memberships

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### ASTM International

VOTING MEMBER ON SUBCOMMITTEES FOR SAMPLING/STATISTICS, DATA MANAGEMENT, FLEET MANAGEMENT

### Data Science Council of America

MEMBER AT LARGE

## Awards

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### The MITRE Corporation

SPARK AWARD

2023 & 2024

- MITRE-internal award recognizing significant contributions and innovation in research.

### MassChallenge

FINALIST

2020 & 2016

- Startup incubator and business model contest. Selected as a Top 20 Finalist, the incubator's highest honor, from more than 500 startups from across the globe.

### Neuro StartUp Challenge

1ST PLACE

2015

- NIH / Oxbridge - funded competition to develop existing NIH patents.

### Wake Forest Business School Business Case Competition

1ST PLACE

2015

- Biotech business case competition with Boston Scientific.

### Federal Bureau of Investigation

DIRECTOR'S AWARD FOR EXCELLENCE

2014

- First unit outside of the FBI to receive this award.

### US Army

BRONZE STAR MEDAL

2009

- Awarded for combat actions in Logar, Afghanistan.

## Publications

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1. Burch, C. (2020). *Altfuelr: An interface to the NREL alternate fuels locator*. <https://CRAN.R-project.org/package=altfuelr>
2. Burch, C. (2020). *Vindecodr: An interface to the US department of transportation VIN decoder*. <https://CRAN.R-project.org/package=vindecodr>
3. Burch, C. (2021). *Excelstrippr: Extracts tabular data from excel reports*. <https://CRAN.R-project.org/package=excelstrippr>