

Benjamin J. Radford

POLITICAL SCIENTIST · DATA SCIENTIST · TS/SCI

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Education

Ph.D. in Political Science

DUKE UNIVERSITY

Durham, NC

2016

Subfields: Political Methodology and Security, Peace, & Conflict

Automated Learning of Event Coding Dictionaries for Novel Domains with an Application to Cyberspace

M.A. in Political Science

DUKE UNIVERSITY

Durham, NC

2013

B.A. in Mathematics and International Studies

UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE

Asheville, NC

2010

Research Experience

Principal Investigator & Principal Data Scientist

SOTERA DEFENSE SOLUTIONS AND DARPA I2O (CYBERSECURITY PROGRAM)

Arlington, VA

2017–Present

- Supervise a team of 10 data scientists and developers.
- Responsible for deliverables to program leadership including presentations and reports.
- Direct research on deep learning applications for cybersecurity attribution efforts.
- Perform and oversee data analysis tasks across several very large datasets.
- Write proposals and respond to solicitations for business development in US Government research space.

Participant and Evaluator

DARPA PROBABILISTIC PROGRAMMING FOR ADVANCED MACHINE LEARNING SUMMER SCHOOL

Arlington, VA

July–Aug., 2017

- Provide feedback on performer technologies to DARPA program manager.

Principal Data Scientist

SOTERA DEFENSE SOLUTIONS AND DARPA I2O (*Network Defense PROGRAM*)

Arlington, VA

2016–2018

- Research applications of machine learning for cybersecurity incident detection.
- Lead research for clustering-based techniques.
- Implement human-in-the-loop system for feedback solicitation and data annotation.
- Investigate NLP techniques for cybersecurity including topic modeling, recurrent neural networks, and word embeddings.
- Present research to program leadership, DoD leadership at DARPA Demo Day, and to MIT Lincoln Laboratory.

Senior Data Scientist

CAERUS ASSOCIATES AND DARPA I2O (*Network Defense PROGRAM*)

Arlington, VA

2015–2016

- Research applications of machine learning for cybersecurity incident detection.

Research Assistant to Professor Michael D. Ward

DUKE UNIVERSITY

Durham, NC

2012–2015

- Spatial-temporal modeling for C-IED, a force protection program of the Office of Naval Research.
- Statistical forecasting for ICEWS, the Integrated Crisis Early Warning System.

Research Assistant to Professor Joseph M. Grieco

DUKE UNIVERSITY

Durham, NC

2012–2015

Intern

JAMES MARTIN CENTER FOR NONPROLIFERATION STUDIES

Washington, D.C.

2008

Selected Publications

- “Automated Dictionary Generation for Political Event Coding”** 2018
Conditionally Accepted at *Political Science Research and Methods*.
- “Anomaly Detection in Cyber Network Data Using a Cyber Language Approach”** 2018
Prepared for the 2018 ASA Symposium on Data Science and Statistics. Available at arXiv:1808.10742.
with Bartley D. Richardson, Shawn E. Davis, Keegan Hines, and David Pekarek.
- “Sequence Aggregation Rules for Anomaly Detection in Computer Network Traffic”** 2018
Prepared for the 2018 ASA Symposium on Data Science and Statistics. Available at arXiv:1805.03735.
with Bartley D. Richardson and Shawn E. Davis.
- “Network Traffic Anomaly Detection Using Recurrent Neural Networks”** 2017
Proceedings of the 2017 MSS National Symposium on Sensor & Data Fusion.
with Leonardo Apolonio, Antonio Trias, and Jim A. Simpson.
- “Enemy at the Gates: Variation in Economic Growth from Civil Conflict.”** 2017
Journal of Conflict Resolution.
with Shahryar Minhas.
- “Small-scale prediction of IEDs in Afghanistan using split-population duration regression”** 2015
Submitted to the Office of Naval Research.
with Andreas Beger and Michael D. Ward.
- “Comparing GDELT and ICEWS Event Data”** 2013
Published online via Research Gate.
with Michael D. Ward, Andreas Beger, Josh Cutler, Matthew Dickenson, and Cassy Dorff.
- “The Evolution of US Policy towards Iran’s Nuclear Program: Lessons for the Obama Administration”** 2010
UNC Asheville Journal of Undergraduate Research.
- “Iran Likely to Take Accusatory Stance at CWC Review Conference”** 2008
WMD Insights (April): 39-43.
- “Summary of Recent United Nations Security Council, European Union, and United States Sanctions Against Iran”** 2008
WMD Insights (April): 44-50.
with Leonard Spector.
- “Algeria, Emirates Plan Nonproliferation-Friendly Nuclear Programs; Egypt Keeps Fuel Cycle Options Open, Rejects Expanded IAEA Monitoring”** 2008
WMD Insights (June): 2-7.
with Leonard Spector.

Software

- mmtsne** 2017
A package for estimating *multiple maps t-distributed stochastic neighbor embedding* (multiple maps t-SNE) models in R.
Open source and available on CRAN: <https://cran.r-project.org/package=mmtsne>.

Selected Working Papers

- “Multilingual Word Embedding for Zero-Shot Text Classification”** Working paper
with Yaoyao Dai.
- “Varieties of Authoritarianism and Peace through Trade, 1950-1999”** Under review
with Joseph Grieco and Christopher Gelpi.

Selected Conferences

Conference Papers

ANNUAL MEETING OF THE AMERICAN POLITICAL SCIENCE ASSOCIATION

Boston, MA

Aug. 2018

“Automated Dictionary Generation for Political Event Coding”

“Multilingual Word Embedding for Zero-Shot Text Classification”

“Going Ballistic: Nuclear Bursts in North Korea and Outbursts on Twitter”

Invited Talk

Reston, VA

AMERICAN STATISTICAL ASSOCIATION SYMPOSIUM ON DATA SCIENCE AND STATISTICS

May 2018

“Sequence Aggregation Rules for Anomaly Detection in Computer Network Traffic”

Conference Paper

Springfield, VA

MILITARY SENSING SYMPOSIUM, NATIONAL SYMPOSIUM ON SENSOR & DATA FUSION

Oct. 2017

“Network Traffic Anomaly Detection Using Recurrent Neural Networks”

Invited Talk

Washington, D.C.

CONFERENCE ON APPLIED STATISTICS IN DEFENSE, AMERICAN STATISTICAL ASSOCIATION

2016

“Cyber Language: Enhancing Cybersecurity Through Statistical and Natural Language Processing Techniques”

Conference Paper

New Orleans, LA

ANNUAL MEETING OF THE INTERNATIONAL STUDIES ASSOCIATION

2015

“Small-scale prediction of IEDs in Afghanistan using split-population duration regression”

Conference Paper

San Francisco, CA

ANNUAL MEETING OF THE AMERICAN POLITICAL SCIENCE ASSOCIATION

2015

“Enemy at the Gates: Variation in Economic Growth from Civil Conflict”

Conference Paper

Chicago, IL

ANNUAL MEETING OF THE MIDWEST POLITICAL SCIENCE ASSOCIATION

2015

“Enemy at the Gates: Variation in Economic Growth from Civil Conflict”

Conference Paper

Durham, NC

DUKE-UNC INTERNATIONAL RELATIONS WORKSHOP

2014

“Embargoes and the Regional Small Arms Trade”

Conference Paper

Chicago, IL

ANNUAL MEETING OF THE MIDWEST POLITICAL SCIENCE ASSOCIATION

2014

“Varieties of Authoritarianism and Peace through Trade, 1950-1999”

Conference Paper

Chicago, IL

ANNUAL MEETING OF THE MIDWEST POLITICAL SCIENCE ASSOCIATION

2013

“Autocracy Type and Conflict Outcome: Assessing the Relative Performance of Personalist Regimes in War”

Conference Paper

Orlando, FL

ANNUAL MEETING OF THE SOUTHERN POLITICAL SCIENCE ASSOCIATION

2013

“Primed for Defense: How I Learned to Start Worrying and Love the Bomb”

Academic Service

Reviewer

POLITICAL SCIENCE RESEARCH & METHODS

2017

Discussant

ANNUAL MEETING OF THE AMERICAN POLITICAL SCIENCE ASSOCIATION

2015

Panel on Prediction

Reviewer

INTERNATIONAL STUDIES REVIEW

2015

Grants, Honors, & Awards

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| 2011–2016 | Graduate Studies Fellowship , Duke University | Durham, NC |
| 2015, 14, 13 | Graduate School Conference Travel Fellowship , Duke University | Durham, NC |
| 2013 | Finalist , Data Visualization Contest, Duke University | Durham, NC |
| 2010 | Graduated summa cum laude , University of North Carolina at Asheville | Asheville, NC |
| 2010 | Top Graduating Math Student , University of North Carolina at Asheville | Asheville, NC |
| 2010 | Distinction in International Studies , University of North Carolina at Asheville | Asheville, NC |
| 2010 | Finalist , Hasbro NERF <i>Battle of the Ads</i> | Asheville, NC |

Teaching Experience

Invited Lecture

GEORGE MASON UNIVERSITY

CSI 899: *Computational Research and Applications*

Arlington, VA

Nov. 2017

Teaching Assistant for Professor Kyle Beardsley

DUKE UNIVERSITY

POLSCI 130: *Introduction to Political Inquiry*

Durham, NC

2013

Programming

- R
- Python
- Scala
- Spark
- \LaTeX
- MapReduce
- Hadoop & HDFS
- SQL

Research Interests

- Machine learning & artificial intelligence
- Statistics
- Deep learning & multitask modeling
- Cybersecurity & cyber conflict
- Forecasting & prediction
- Political methodology
- Information extraction
- Political security and conflict
- WMD & counter-proliferation