

# Nathan G. Welch

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## CONTACT INFORMATION

University of Washington  
Seattle, WA 98195 USA

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*Online:* www.linkedin.com/in/nathangwelch

## INTERESTS

Bayesian statistics, statistical methods for large data sets, statistics for public policy

## EDUCATION

**University of Washington**, Seattle, Washington USA

Ph.D., Statistics, 2023 (anticipated)

Dissertation Topic: *Probabilistic forecasting methods for clustered and spatial data*

Advisor: Adrian E. Raftery

**Georgetown University**, Washington, District of Columbia USA

M.S., Mathematics and Statistics, December, 2013

**University of Alabama at Birmingham**, Birmingham, Alabama USA

B.S., Mathematics, August, 2007

## HONORS AND AWARDS

Center for Enterprise Modernization: Director's Award, 2015

Center for Enterprise Modernization: Capability Development Fund (\$15 000), 2014

University of Alabama at Birmingham: Summa Cum Laude, Honors in Mathematics, 2007

National Science Foundation: Mentoring Through Critical Transition Points Fellowship, 2007

National Science Foundation: Mathematics Fast-Track Scholarship, 2005-2007

## EMPLOYMENT

**University of Washington**, Seattle, Washington USA

*Full-time Ph.D. Student*

January 2018 - Present

**The MITRE Corporation**, McLean, Virginia USA

*Lead Data Scientist*

July 2013 - Present

*Senior Quantitative Analyst*

February 2011 - June 2013

**Booz Allen Hamilton**, McLean, Virginia USA

*Senior Consultant*

January 2009 - January 2011

*Consultant*

January 2008 - December 2008

## PUBLICATIONS

**Welch, N.G.** and Raftery, A. E. (2022). Probabilistic forecasts of migration flows between all countries. Under review.

Li, S., Beckman, J.A., **Welch, N.G.**, Bjelkengren, J., Masri, S.C., Minami, E., Otero, S.A., Levy, W.C., O'Brien, K.D., Lin, S., Farris, S.D., Cheng, R.K., Wood, G., Koomalsingh, K., Kirkpatrick, K., McCabe, J., Leary, P.J., Chassagne, F., Chivukula, V.K., Aliseda, A., Mahr, C. (2019). Accuracy of Doppler blood pressure measurement in continuous-flow left ventricular assist device patients. *ESC Heart Failure*. **6**(4), 793-798.

## CONFERENCE PRESENTATIONS

**Welch, N.G.** and Raftery, A. E. (2022, June 26 - July 1). *Modeling and forecasting bilateral migration flows for all countries*. 2022 ISBA World Meeting, The International Society for Bayesian Analysis. Montreal, Canada.

**Welch, N.G.** and Raftery, A. E. (2022, April 6-9). *Models of international migration destination preferences*. 2022 Annual Meeting, Population Association of America. Atlanta, Georgia.

**Welch, N.G.** and Raftery, A. E. (2021, December 5-10). *Modeling and forecasting bilateral migration flows for all countries*. 2021 International Population Conference, International Union for the Scientific Study of Population. Hyderabad, India.

**Welch, N.G.** and Raftery, A. E. (2021, May 5-8). *Modeling and forecasting bilateral migration flows for all countries*. 2021 Annual Meeting, Population Association of America. St Louis, Missouri.

**Welch, N.G.** and Raftery, A. E. (2020, April 22-25). *Probabilistic forecasts of migration flows between all countries*. 2020 Annual Meeting, Population Association of America. Washington, District of Columbia.

**Welch, N.G.** and Raftery, A. E. (2019, November 18-21). *Estimating and forecasting migration for all pairs of countries with a pseudo-Bayes approach*. 11th International Conference on Social Informatics, Doha, Qatar.

SELECTED  
PROFESSIONAL  
EXPERIENCE

**Analytics and Programming**

*MITRE Sponsored Research, National Patient Safety Partnership (NPSP)*

McLean, Virginia USA 2014 - 2015

- Member of a select, cross-disciplinary team mining electronic health records from multiple children's hospital centers
- Implemented probabilistic machine learning methods to discover systemic errors in medication ordering processes

*Federal Aviation Administration, Center for Advanced Aviation System Development*

McLean, Virginia USA 2013 - 2017

- Leveraged Hadoop ecosystem tools, e.g. PySpark, to discover trends in terabytes of data spanning several years
- Researched and implemented density clustering method to discover anomalous flight patterns recorded ADS-B transmissions

**Management Strategy**

*Department of Homeland Security, Science & Technology Directorate*

Washington, District of Columbia USA 2012

- Led cost risk analysis for multibillion dollar cyber security program by applying deep knowledge of mathematical statistics
- Analysis set the foundation for the program's future cost risk methodology

*Department of Commerce, Bureau of the Census*

Washington, District of Columbia USA 2011

- Briefed Deputy Director in addition to directly advising the CIO and Associate Director for Economic Programs
- Co-led Analysis of Alternatives for a cloud computing acquisition decision, proving \$40M increase over initial estimate

ACADEMIC  
EXPERIENCE

**University of Washington**, Seattle, Washington USA

*Research Assistant, BayesPop Project* March 2021 - present

*Instructor, STAT 560 Hierarchical Modeling, Winter 2021.* January 2021 - March 2021

*Research Assistant, BayesPop Project* March - December 2020

*Teaching Assistant, STAT 560 Hierarchical Modeling, Winter 2020.* January 2020 - March 2020

*Research Assistant, BayesPop Project* August - December 2019

*Instructor, STAT 395 Probability Theory, Summer 2019.* July - September 2019

*Research Assistant, BayesPop Project* March - July 2019

*Teaching Assistant, STAT 560 Hierarchical Modeling, Winter 2019.* January - March 2019

*Research Assistant, BayesPop Project* September - December 2018

*Instructor, STAT 395 Probability Theory, Summer 2018.* July - September 2018

*Teaching Assistant, STAT 560 Hierarchical Modeling, Spring 2018.* March - June 2018

*Teaching Assistant, STAT 220 Statistical Reasoning, Winter 2018.* January - March 2018

**The MITRE Institute**, McLean, Virginia & Bedford, Massachusetts USA

*Instructor, Introduction to Bayesian Statistics.*

March, 2016

*Instructor, Introduction to Statistical Computing.*

March, 2016

**University of Alabama at Birmingham**, Birmingham, Alabama USA

*Mathematics Fast-Track Student.*

May 2005 - August 2007

*Teaching Assistant, MA 268 Introduction to Mathematical Biology.*

August - December, 2006

*Instructor, Math Learning Lab.*

January - August, 2006

COMPUTING  
EXPERIENCE

**Proficient:** R, Python, SQL, Unix Shell

**Familiar:** Git, Java, Julia, Pig, Pyspark

**Interests:** C/C++, Scala