

Catherine King

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RESEARCH INTERESTS

Misinformation, social media analytics, computational social science, network science, election studies

EDUCATION

Carnegie Mellon University

PhD: Societal Computing in the Software and Societal Systems Department
Advisor: Dr. Kathleen Carley

August 2019 – Present
GPA: 4.24/4.33

The College of William & Mary

Master of Science: Computational Operations Research
Capstone project: "Optimizing voter wait times" [simulation](#) and [paper](#)

August 2014 – May 2016
GPA: 4.0/4.0

The College of William & Mary

Bachelor of Science: Mathematics, with a minor in Computer Science
Summa cum laude, Honors in Mathematics
Honors Thesis: "[Nonlinear models of zooplankton communities](#)"

August 2010 – May 2014
GPA: 3.83/4.0

RELEVANT COURSEWORK

CMU: Applied Machine Learning, Dynamic Network Analysis, Computational Modeling of Complex Socio-Technical Systems, Critical AI Studies for Public Policy, R for Data Science, Data-Focused Python

W&M (Master's): Applied Linear Regression, Data Mining, Design and Analysis of Experiments, Internet Algorithms and Economics, Linear Programming, Network Location Theory, Network Optimization, Simulation and Modeling

AWARDS

- **Best Paper Award (Oct 2020):** "Lying about lying on social media: a case study of the 2019 Canadian elections" in the SBP-BRiMS 2020 Conference. Determined by the editors, based on the paper and the presentation.
- **"Fan Favorite" Award (May 2016):** modeling and simulation competition at the MODSIM World 2016 conference, "fan favorite" as voted by conference attendees and sponsors. Additionally, a runner-up for the judge's award (project simulation found at <https://faster-voting.wm.edu/>.)
- **3rd place, WINFORMS Student Excellence Award (May 2016):** original research in Operations Research, judged based on a short paper and presentation of my master's capstone project (the faster voting project)
- **Luther T. Connor Prize (May 2014):** graduating senior with "enthusiasm for mathematics", "respect for others", May 2014. Determined by the Mathematics department.
- **1st place in Undergraduate Research Competition (Oct 2013):** International Symposium on Biomathematics and Ecology Education and Research conference. Judged from a presentation and a research manuscript

EXPERIENCE

Carnegie Mellon University – Research Assistant

August 2019 – present

- Designed a survey to gather user behavior when seeing misinformation on social media and user opinions on various misinformation countermeasures
- Analyzed differential treatment of female US presidential candidates on social media, monitored levels of both hate speech and gendered hate speech directed at all major Democratic candidates in 2020
- Identified COVID-19 conspiracy theory tweets to better understand who spreads conspiracy theories and how they are effectively spreading them
- Helped design a game meant to train analysts on how to detect and fight misinformation on social media

MITRE – Data Scientist

August 2018 – January 2020

- Contributed programming and analysis work to spectrum consumption modeling in Java
- Supported Army manpower modeling efforts by building linear regression models and economic analyses
- Helped build a system dynamics model that predicts future adoption rates of UAVs in the United States

Genworth – IT Analyst / Modeling Analyst

July 2016 – July 2018

- Supported and developed actuarial models in MATLAB, SAS, and R
- Developed a simulation of a long-term care projections model in MATLAB

Newport News Shipbuilding – Modeling & Simulation, Analyst Intern

May 2015 – August 2015

- Contributed analysis work for a simulation (data collection, verification of the model, user manual writing)

- Implemented features to the model in Java and reviewed/verified new code for accuracy
- The College of William & Mary – Teaching Assistant** September 2013 – May 2016
- Calculus II TA (Fall 2014-2016): led lab sessions for each class once a week and graded assignments/quizzes
 - Grader (Spring 2014-2016): graded for Elementary Prob/Stat, Differential Equations, and Mathematical Stats
 - Introduction to Mathematical Biology TA (Fall 2013): helped students learn to use MATLAB when modeling biomath problems. Graded homework assignments and held review sessions/office hours before exams
- The College of William & Mary – Research Assistant** January 2012 – August 2014
- Modeled zooplankton/phytoplankton dynamics in the Chesapeake Bay with Professors Day and LaMar
 - Turned project into senior honors thesis and gave presentations at several conferences
 - Published a paper in a peer-reviewed conference proceedings

PUBLICATIONS

- Catherine King, Samantha C. Phillips, and Kathleen M. Carley. “**Registered Report: A path forward on online misinformation mitigation based on current user behavior.**” *Under Review at Scientific Reports*.
- J.D. Moffitt, Catherine King, and Kathleen M. Carley. “**Connecting the Domains: An Investigation of Internet Domains found in COVID-19 Conspiracy Tweets**”. *Under Review at Computational and mathematical Organization Theory*.
- Catherine King and Kathleen M. Carley. “[**Gender dynamics on Twitter during the 2020 Democratic Presidential Primary**](#),” Forthcoming in *Social Network Mining and Analysis* (2023)
- J.D. Moffitt, Catherine King, and Kathleen M. Carley. “[**Hunting Conspiracy Theories during the COVID-19 Pandemic**](#).” *Social Media + Society* (2021). [[BLOG POST](#)]
- Catherine King, Christine Sowa Lepird, and Kathleen M. Carley. “[**Project OMEN: Designing a Training Game to Fight Misinformation on Social Media**](#).” *Tech Report*. Carnegie Mellon University, Institute for Software Research.
- Daniele Bellutta, Catherine King, and Kathleen M. Carley. “[**Deceptive accusations and concealed identities as misinformation campaign strategies**](#).” *Computational and Mathematical Organization Theory* (2021).
- Catherine King, Daniele Bellutta, and Kathleen M. Carley. “[**Lying about lying on social media: a case study of the 2019 Canadian elections**](#),” *Proceedings of the 2020 SBP-BRIMS Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation*, virtual October 2020
- Stephanie Glasser and Catherine King. “[**System Dynamics for Estimating Suas Operations**](#),” *Proceedings of the 2019 Winter Simulation Conference (WSC)*, December 2019, doi: 10.1109/WSC40007.2019.9004829
- Catherine King and Lawrence M. Leemis. “[**Data analysis and simulation: Optimizing voter wait times**](#)” *Proceedings of the 2016 IEEE Systems and Information Engineering Design Symposium (SIEDS)*, 2016,
- Catherine King, Katherine Shipman, Sarah Day, and Drew LaMar. “[**Dimension and mortality in linear stage class models of *Acartia tonsa***](#)” *Proceedings on the Sixth Symposium on BEER*, Arlington, VA, October 2013

SKILLS

Software/Programming Languages:

- Proficient: R, Python, MATLAB, ORA, SAS, LaTeX
- Familiar: Java, SQL, Minitab

Languages: English (native), Italian (heritage)

ACTIVITIES

CMU Graduate Student Association, External Affairs Committee Member:

- Helped over 20 CMU students sign up to be a poll worker during the 2020 poll worker shortage
- Met with congressional staff to ensure relevant graduate student issues (mental health, sexual harassment, increased NSF funding) would remain in the final version of the 2022 “[**CHIPS and Science Act**](#)”.
- Registered students to vote in advance of the 2022 elections

SCS PhD Dean’s Advisory Committee, social sub-committee:

- *Coffee Chats* – designed a system that periodically emailed graduate students to sign up to meet others over virtual coffee during the pandemic (or in-person coffee now). Designed an algorithm that would match people based on hobbies or other interests and send out automated emails to individuals to let them know who they were paired with. The program has high engagement, with ~50 people participating each time it is run.
- *Virtual Game Nights* – organized virtual game nights for students during the pandemic

Pittsburgh Poll Worker: Poll worker in every Pittsburgh election, including primaries, since 2020