MaryClare **Roche**

POLITICAL SCIENTIST · DATA SCIENTIST

 mcroche.github.io | MCRoche | maryclare-roche

Education

University of Rochester   *Rochester, NY*

PH.D., M.A. IN POLITICAL SCIENCE   *2013 - 2020*

- *Three Essays on Political Actors*, Doctoral Dissertation, 2020
  - Committee: Dr. Gretchen Helmke, Dr. Mark Fey, Dr. Jack Paine
  - Concentrations: Formal theory, Statistical methodology, Comparative politics
- *Non-Consecutive Executives: Changing Preferences in a Changing World*, Master's Thesis, 2017
  - Advisor: Dr. Mark Fey

University of Maryland, College Park   *College Park, MD*

B.S. IN PHYSICS (PRIMARY) AND GOVERNMENT & POLITICS (SECONDARY)   *2009 - 2013*

Skills

Programming	R: tidyverse, topicmodels, stm, quanteda, TensorFlow, zoo, arabicStemR, ggplot2; python: numpy, pandas, TensorFlow, scipy, spaCy, gensim, matplotlib, multithreading, multiproccesing, selenium
Software	Matlab, Mathematica, ArcGIS, Docker, Stata, SPSS, LaTeX, Excel
Technical	Econometrics (Advanced), Time Series Analysis, Structural Estimation, Causal Inference, Machine Learning, Imputation, Web Scraping, Natural Language Processing (NLP) in English and Arabic

Experience

Director of Technology & Innovation   *Washington, D.C.*

ARAB BAROMETER, PRINCETON UNIVERSITY   *September 2022 - present*

- Decides the direction of Arab Barometer's technological advances by evaluating all new technology Arab Barometer adopts
- Develops strategies for survey programming & stress-testing, as well as processing & publishing incoming data
- Designs programming assessments for applicants & on-boarding materials for new hires
- Responsible for hiring, training, managing & mentoring Data Team members
- Coordinates with field partners across the Middle East & North Africa to assist with quality control, respond to real-time tech issues
- Represents Arab Barometer on various panels discussing Arab Barometer's data, particularly as it relates to views of gender dynamics
- Manages communications and expectations between data team members and the rest of the staff
- Designs programming assessments for applicants & on-boarding materials for new hires
- Creates & maintains database of 16 years of Arab Barometer data
- Manages communications and expectations between Data Team members & Media Team

Senior Research Specialist   *Washington, D.C.*

ARAB BAROMETER, PRINCETON UNIVERSITY   *August 2020 - September 2022*

- Oversaw and aided in the development of custom data verification software used in real-time to evaluate the quality of incoming survey data
- Built custom graphing and statistical analysis R packages exclusively for Arab Barometer for both English and Arabic
- Created data processing pipeline that decreased time-to-publication by over six months
- Developed novel SMS messaging program in python to routinely deliver surveys across the Middle East and North Africa
- Designed and oversaw data processing pipeline for incoming data from 12 countries across three platforms with the use of Stata, R, and SPSS
- Created econometric models and data visualization to be presented at the US State Department, several US Embassies, the United Nations, & various international non-profits

University of Rochester   *Rochester, New York*

DOCTORAL THESIS WORK   *2013-2020*

- Scraped original text data via multi-threading over a generated cluster of temporary, localized IP addresses with Microsoft Azure and Docker
- Created topic models using both LDA and GloVe on Arabic text in both R and python
- Utilized Optical Character Recognition (OCR) API on official government documents in Arabic to supplement missing information
- Built an Arabic-to-English dictionary using Google and Bing translator APIs
- Analyzed Irregular Time Series data to uncover temporal speaking patterns
- Uncovered unexpected gender dynamics in Middle Eastern semi-democratic parliaments
- Created game theoretic models to explain the conditions that allow democratic institutions in authoritarian regimes to simultaneously create coordination problems for regime opposition and solve them for regime allies

RESEARCH ASSISTANT – ACCRA, GHANA

- Collected primary source data from the Department of Education, Department of Roads and Bridges, Ghanaian National Archives, and Electoral Commission
- Mapped census data collected using OCR in ArcGIS
- Developed and solved formal theoretical models, reviewed calculations, edited manuscripts

TEACHING ASSISTANT
- Taught R for statistical analysis and data presentation
- Lead recitations and mentored students at both the undergraduate and graduate level; classes included Data Analysis, Game Theory, Introduction to Comparative Politics, and Political Philosophy

International Monetary Fund   *Washington, D.C.*

RESEARCH ASSISTANT   *Fall 2015*
- Created and solved a game theoretic model describing the relation between government regulation and banks' investment portfolios
- Taught advanced game theoretic concepts

Center for European Nuclear Research (CERN)/University of Maryland High Energy Physics Group   *Geneva, Switzerland*

RESEARCH ASSISTANT   *Summer 2011, Summer 2012*
- Collected and presented data from new detectors to be installed in the Compact Muon Solenoid (CMS) experiment at CERN. Based on the calibrations conducted, the new detectors were installed in CMS, which ultimately discovered the Higgs boson
- Taught new research assistants basic java programming

Selected Presentations

European Political Science Association   *Glasgow, Scotland*

NATURAL LANGUAGE PROCESSING FOR SHORT, ANONYMIZED SURVEY RESPONSES   *June 2023*
- Served as Panel Chair for New Developments in Text Analysis

World Association for Public Opinion Research   *Dubai, United Arab Emirates*

NATURAL LANGUAGE PROCESSING FOR SHORT, ANONYMIZED SURVEY RESPONSES   *November 2022*
- Served as Panel Chair for Big Data, Sentiment Analysis, and Machine Learning

World Bank   *Washington, D.C.*

HOW CAN FACTS HELP US BRING WOMEN INTO THE WORKFORCE IN MENA?   *February 2023*
- Reviews findings on gender attitudes from Arab Barometer Wave VII and historical data

Middle East Institute   *Washington, D.C. - Remote*

GENDER ATTITUDES AND TRENDS IN MENA   *October 2022*
- Reviews findings on gender attitudes from Arab Barometer Wave VII

United Nations   *New York, NY - Remote*

WOMEN AND COVID-19 IN MENA: FINDINGS FROM THE SIXTH WAVE OF ARAB BAROMETER   *September 2021*
- Co-presented with Dr. Amaney Jamal, Dean of Princeton School of Public and International Affairs
- Served as data analyst, presentation creator