SARAH MCDONALD
sarahcmcdnld@gmail.com
https://github.com/sm9dv • https://www.linkedin.com/in/sarahmcdnld

EDUCATION

2016 - 2020   BSc, Mathematics and BA, Economics; Marymount University
Honors Program, *Summa cum laude*

2017   Oxford Study Abroad Programme
Participated in a tutorial exploring contemporary perspectives of the United Kingdom penal system, including capital punishment, life imprisonment, and restorative justice (with Dr. Gabrielle Watson, Faculty of Law).

RESEARCH EXPERIENCE

2019-   *Research Assistant, Acting Fellow, and Intern*, Data Science for the Public Good Program
Biocomplexity Institute & Initiative, Social & Decision Analytics Division, University of Virginia

- Developed a mathematical formalization of common knowledge on directed Facebook and Twitter-type communication networks (Department of Defense funding).
- Conducted network and node-level analysis of labor force workflows in Fairfax County, Virginia at census tract level using LEHD Origin-Destination Employment Statistics data (Fairfax County Government funding).
- Structured and scripted a dashboard with interactive visualizations for locating potentially vulnerable Virginia high school seniors impacted by COVID-19 (Bill and Melinda Gates Foundation funding).
- Applied hierarchical clustering to job ad data to examine skills required for specific jobs; used sequence analysis to analyze resume data; identified and organized an inventory of federal, private, and not-for-profit data for describing the national skilled technical workforce on an interactive dashboard; visualized educational pathways, career pathways, and skill supply and demand for skilled technical workers in Virginia metropolitan areas (National Science Foundation funding).
- Investigated and created new techniques for visualizing National Center for Science and Engineering Statistics data with variability, specifically lollipop charts, slope graphs, and "statebins" charts (National Science Foundation funding).
- Compared and mapped discrepancies between provider-reported Federal Communications Commission broadband coverage estimates with relevant household-reported American Community Survey and Microsoft Airband usage data at census tract, county, and state levels (USDA Economic Research Service funding).
- Led two undergraduate interns through a three-month project benchmarking proprietary data with the Job Openings and Labor Turnover Survey and Occupational Employment Statistics data.
- Communicated with program sponsors through oral presentations, poster presentations, and written weekly updates.
- Collaborated with multidisciplinary, vertically integrated teams of students and faculty.
- Used git and Github for version control, and R packages (e.g., tidyverse, data.table) to acquire, profile, clean, transform, analyze, and visualize data.

2019-20   *Honors Scholar*, Undergraduate Honors Thesis, Marymount University Honors Program

- Independently designed and executed a research project examining the effect of Catholic sex abuse scandals on Catholic higher education in the United States.
- Retrieved multiple datasets through web scraping; processed and merged complex data, including the Integrated Postsecondary Education Data System.
- Used multiple linear regression to explore the influence of negative publicity due to scandals in the Catholic Church on enrollment at Catholic colleges, universities, and seminaries.

CONFERENCE PRESENTATIONS

Ray, S., **McDonald, S**., Hart, O., Pietrowicz, S., Pristavec, T., Kramer, B., Linehan, K., Tobin, J., Shipp, S., Keller, S. (2020). "Fairfax County Labor Markets: Characterizing Local Workforce and Employment Network." Presented at the Knowledge Discovery and Data Mining Conference, Association for Computing Machinery, Virtual.

Ray, S., **McDonald, S**., Hart, O., Pietrowicz, S., Pristavec, T., Kramer, B., Linehan, K., Tobin, J., Shipp, S., Keller, S. (2020). "Fairfax County Labor Markets: Characterizing Local Workforce and Employment Network." Presented at the Data Science for Public Good Symposium, University of Virginia Biocomplexity Institute and Initiative, Virtual.

McDonald, S. (2020). "The Effect of Catholic Sex Abuse Scandals on Catholic Higher Education in the United States." Presented at Marymount University Student Research Conference, Virtual.

Savchyn, K., **McDonald, S.**, Sawhney, R., Pristavec, T., Goldstein J., Shipp, S. (2019). "Broadband Data Validation: Comparing U.S. Broadband Coverage". Poster presented at the GEOINTegration Summit, United States Geospatial Intelligence Foundation, Herndon, VA.

Savchyn, K., **McDonald, S.**, Sawhney, R., Pristavec, T., Goldstein J., Shipp, S. (2019). "Broadband Data Validation: Comparing U.S. Broadband Coverage". Poster presented at the Data Science for Public Good Symposium, University of Virginia Biocomplexity Institute and Initiative, Arlington, VA.

McDonald, S. (2018). "An Economic Inquiry into Voting Preferences in the 2012 and 2016 Presidential Elections." Presented at Marymount University Student Research Conference, Arlington, VA.

PUBLICATIONS (Broad Audience)

Ray, S., **McDonald, S**., Hart, O., Pietrowicz, S., Pristavec, T., Kramer, B., Linehan, K., Tobin, J., Shipp, S., Keller, S. (2020). Fairfax County Labor Markets: Characterizing Local Workforce and Employment Network. SAGE MethodSpace, *under review*.

Pristavec, T., Goldstein, J., Savchyn, K., **McDonald, S.**, & Sawhney, R. (2020). Broadband coverage in the US: When sources disagree. SAGE MethodSpace, June 5.

Lancaster, V., Cohen, S., Fowers, A., Isch, C., & **McDonald, S.** (2020). Using Resume Data to Identify Skilled Technical Candidates. SAGE MethodSpace, May 26.

FUNDING

2020   *Selected and funded Acting Fellow, Data Science for the Public Good Young Scholars Program*, University of Virginia Biocomplexity Institute.

2019   *Selected and funded Undergraduate Intern, Data Science for the Public Good Young Scholars Program*, University of Virginia Biocomplexity Institute.

2018-19 *Pablo Coto Memorial Scholarship*, Marymount University. Awarded for exemplifying academic excellence and leadership.

2016-20 *Honors Academic Scholarship*, Marymount University.

2016-20 *President's Academic Scholarship*, Marymount University.

HONORS & AWARDS

2020   *Academic Excellence Award (Economics)*, Marymount University. Awarded for superior academic performance in major, contributions to department and field of study through curricular and co-curricular activities.

2020   *Academic Excellence Award (Mathematics)*, Marymount University. Awarded for superior academic performance in major, contributions to department/field of study through curricular and co-curricular activities.

2020   *Senior Leadership Award*, Marymount University. One of ten awardees for outstanding contributions the Marymount Community and the greater community as student leaders.

2019   *Senior Resident Assistant of the Year*, Marymount University.

| 2019 | *Finalist*, *Behavior-Centered Design Challenge*, Rare Center for Behavior and the Environment. Worked in a multidisciplinary team to create behavioral ridesharing incentives to reduce greenhouse gas emissions for INOVA, one of Northern Virginia's largest employers. |
| 2018 | *Second Place Undergraduate Presentation*, Marymount University Student Research Conference. |

UNIVERSITY SERVICE
2019-20   *President*, Student Government Association, Marymount University.
2017-19   *Resident Assistant*, Office of Campus and Residential Services, Marymount University.
2018-19   *Peer Tutor*, Center for Teaching and Learning, Marymount University. Conducted one-on-one tutoring sessions for college students in mathematics courses at all levels, from remedial mathematics to graduate-level courses.

SKILLS
Statistical programming environments: R, RStudio: dplyr, tidyr, stringr, ggplot2, plotly, leaflet, data.table, sf, shiny, knitr, rvest, igraph, statebins
Other: SQL, Java, HTML, CSS, LaTeX, GitHub, git
Microsoft Office: Excel, Access, Word, PowerPoint

PROFESSIONAL MEMBERSHIPS
2019-20   *Member*, Association for Women in Mathematics, Marymount University.
2018-20   *President and Chapter Founder*, American Statistical Association, Marymount University.
2018-20   *Member*, Kappa Mu Epsilon, Marymount University.