

# Ruoyi Cai

Department of Biostatistics, University of Washington  
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## EDUCATION

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### University of Wisconsin-Madison

Bachelor of Science in *Statistics (Honors)* and *Mathematics*

May 2019

- Dean's List (All Semesters)
- Hildale Undergraduate/Faculty Research Fellowship
- University Book Store Academic Excellence Award

2018

2019

### University of Washington

Ph.D., Department of Biostatistics

September 2019 – Present

- School of Public Health Award

2019

## SKILLS

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- R, Julia, Java, Linux, C++
- Techniques for genetics research: growing and collecting cells; extracting and purifying RNA; running gels; using microscope; gene annotation; functional enrichment

## RESEARCH EXPERIENCES

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### Department of Biostatistics, University of Washington

Sep 2019 – Present

*Research assistant advised by Professor Sharon Browning*

- Worked on historical effective population size estimation using identical-by-descent segments in the X chromosomes of pairs of individuals
- Investigated gender-specific population dynamics by comparing the historical effective population sizes estimated from X chromosomes with results from the autosomes
- Analyzed both simulated data and real human X chromosomes data; developed pipelines for inferring historical effective population sizes using human X chromosomes

### Department of Statistics, University of Wisconsin-Madison

Spring 2018 – June 2019

*Senior Honors Thesis advised by Professor Cecile Ane*

- Worked on senior honors project to investigate methods for identifying the optimal historical structures reflected in the genomes of many species
- Developed a goodness-of-fit test to identify the population structure and reticulation complexity sufficiently explaining the evolutionary relationships reflected in genomic data
- Coded functions and scripts in Julia for the application of the test and for doing simulations on empirical examples to evaluate the precision and efficiency of the test; examined the literature for methodologies and models that could be applied to improve the test

### Department of Genetics, The Gasch Lab, University of Wisconsin-Madison

Aug 2017 – June 2019

*Undergraduate Research advised by Professor Audrey Gasch*

- Conducted independent research to study the effect of strain backgrounds and gene expression levels on the stress sensitivity of the budding yeast *Saccharomyces cerevisiae*
- Analyzed different growth of yeast strains from different lineages under salt stress; investigated differential gene expression of yeast strains under salt stress using RNA sequencing
- Discovered research questions, wrote research proposal, designed experiments, applied benchwork and computational techniques of genetics research, drew conclusions from research data using statistical analysis, and presented research findings in lab meeting

## WORK EXPERIENCE

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### Undergraduate Learning Center, University of Wisconsin-Madison

Sep 2017 – May 2019

*Paid Tutor in Statistics*

- Assisted with statistics courses and programming in R for around 20 students by one 3-hour drop-in session and by appointment every week
- Clarified example problems and summarized concepts for students to enhance their understanding of course materials; successfully built up students' skills to solve problems via statistical tools