

# Rebecca Anne MacPherson

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## EDUCATION

- 2023 (expected) **Ph.D. Graduate Student, Genetics**  
Clemson University, Clemson, SC  
Advisor: Dr. Trudy F. C. Mackay, FRS
- 2018 **Bachelor of Science, Genetics**  
Clemson University, Clemson, SC  
Minors in Microbiology and Psychology, GPA: 4.00/4.00  
Graduated with General and Departmental Honors from Calhoun Honors College

## RESEARCH EXPERIENCE

- 2018 – Present **Graduate Research Assistant, Mackay Lab, Center for Human Genetics and Department of Genetics and Biochemistry**  
Clemson University, Greenwood, SC  
Creating models of human disease (Coffin-Siris syndrome, Fetal Alcohol Spectrum Disorder) using *Drosophila melanogaster*. Utilizing RNAi and CRISPR technologies to create individuals with aberrant transcriptional networks therefore aiming to discover possible therapeutic targets and mechanisms for disease pathogenesis. Learning quantitative and statistical methods for genetic analyses. Actively collaborating with clinical, diagnostic, and research staff at the Greenwood Genetic Center.
- 2018 **Undergraduate Research Assistant, Clark Lab, Department of Genetics and Biochemistry**  
Clemson University, Clemson, SC  
Investigated unknown neuromuscular disease within a litter of Newfoundland puppies through sequencing analysis of genes implicated in Myasthenia Gravis. Gained exposure to complications of obtaining consent from dog owners before collecting samples.
- 2016-2018 **Undergraduate Research Assistant, Tzeng Lab, Department of Biological Sciences**  
Clemson University, Clemson, SC  
Selected by professor to assist graduate student in cancer research, mastered cell culture and transfection techniques for multiple cancer cell lines, performed western blots. Research culminated in manuscript currently in final stages of preparation.
- 2014-2018 **Undergraduate Research Team Member, iGEM Team, Department of Biological Sciences**  
Clemson University, Clemson, SC  
Worked as an individual and as a team leader to complete a self-amplifying biosensor, optimize a protocol for isoprenoid collection from *Escherichia coli*, and develop a tool for antibiotic penetration in *B. subtilis* biofilms. Exposed to a wide variety of microbiology, molecular genetics, and synthetic biology techniques.
- 2017 **Summer Intern, Molecular Diagnostic Laboratory**  
Greenwood Genetic Center, Greenwood, SC  
Strengthened understanding of clinic operations and challenges faced by diagnostic laboratories. Obtained extensive experience in DNA amplification, sequencing, and analysis, performed investigational analyses on patient DNA, orchestrated consolidation of PCR conditions laboratory-wide, exposed to cytogenetics and biochemical genetics laboratories.

- 2016 **Head Counselor, EUREKA! Undergraduate Research Summer Program**  
Clemson University, Clemson, SC  
Worked in the K. Smith biochemistry and genetics laboratory, mastered basic molecular genetic techniques including gel electrophoresis and DNA extraction, gained exposure working with eukaryotes, successfully complemented *Cryptococcus neoformans* acetate kinase mutant
- 2015 **Head Counselor, EUREKA! Undergraduate Research Summer Program**  
Clemson University, Clemson, SC  
Worked in the Tzeng microbiology laboratory, wrote protocol to collect isoprenoids from modified *E. coli* based on current literature
- 2014 **Participant, EUREKA! Undergraduate Research Summer Program**  
Clemson University, Clemson, SC  
Mastered basic microbiology techniques include plating, spreading, streaking, mixing media, genetically manipulated *E. coli* plasmids through synthetic biology

### PUBLICATIONS

- 2020 Sass, T. N.\*, **MacPherson, R. A.\***, Mackay, T. F. C., Anholt, R. R. H. 2020. A High-Throughput Method for Measuring Alcohol Sedation Time of Individual *Drosophila melanogaster*. *Journal of Visual Experiments* (158), e61108, doi:10.3791/61108

### PRESENTATIONS

- 2020 The Allied Genetics Conference: Washington D.C.\* **MacPherson, R. A.**, Morozova, T. V., Sass, T. N., Mackay, T. F. C., Anholt, R. R. H. Genetic Variation in Alcohol-Induced Modulation of *Drosophila* snoRNAs. Center for Human Genetics and Department of Genetics and Biochemistry, Clemson University, Greenwood, SC.  
\*hosted remotely due to COVID-19
- 2019 American Society for Human Genetics: Houston, TX. **MacPherson, R. A.**, Anholt, R. R. H., Mackay, T. F. C. A *Drosophila* Model for Coffin-Siris Syndrome. Center for Human Genetics and Department of Genetics and Biochemistry, Clemson University, Greenwood, SC.
- 2019 Graduate Research and Discovery Symposium: Clemson, SC. **MacPherson, R. A.** Anholt, R. R. H., Mackay, T. F. C. A Fly Model for Coffin-Siris Syndrome. Center for Human Genetics and Department of Genetics and Biochemistry, Clemson University, Greenwood, SC.
- 2017 College of Science Undergraduate Research Showcase: Clemson, SC. **Jones, R.**, Saffarian, M., Huang, G., Tzeng, T-R. The Effect of MazF, *Escherichia coli* Ribonuclease, on Gastric, Breast, and Colon Adenocarcinomas. Department of Biological Sciences, Clemson University, Clemson, SC.
- 2016 Calhoun Honors College EUREKA! Poster Presentations: Clemson, SC. **Jones, R.**, Kisirkoi, G., Ammar, M., Smith, K. Role of acetate metabolism in fungal meningitis: Complementation of an acetate kinase mutant in *Cryptococcus neoformans*. Department of Genetics and Biochemistry, Clemson University, Clemson, SC.
- 2016 Clemson Biological Sciences Annual Student Symposium: Clemson, SC. Eller, J., Tzeng, A., Wilson, J., Bickford, L., Chiu, C., Gandhi, M., **Jones, R.**, Summers, M., Mathew, R., Borthayre, S., Hoy, S., Sridharan, J., Saffarian, M., Tzeng, T-R. Cellular Export of Isoprenoids for Biofuel Synthesis. Department of Biological Sciences, Clemson University, Clemson, SC
- 2016 South Carolina Branch American Society of Microbiology 2016 Spring Meeting: Charleston, SC. Bickford, L., Borthayre, S., Chiu, C., Eller, J., Gandhi, M., Hoy, S., **Jones, R.**, Mathew, R., Saffarian, M., Sridharan, J., Summers, M., Tzeng, A., Wilson, J., Tzeng, T-R. Optimization of Bivector Systems for Export of Isoprenoids in Biofuel Applications. Department of

Biological Sciences, Clemson University, Clemson, SC

- 2015 Calhoun Honors College EUREKA! Poster Presentations: Clemson, SC. **Jones, R.**, Saffarian, M., Tzeng, T-R. Analysis of Cellular Production of Canthaxanthin in *Escherichia coli*. Department of Biological Sciences, Clemson University, Clemson, SC
- 2014 Calhoun Honors College EUREKA! Poster Presentations: Clemson, SC. **Jones, R.**, Saffarian, M., Brown, A., Tzeng, T-R.. Self-Amplifying Biosensor for Rapid Detection of *N*-Acyl-Homoserine Lactone. Department of Biological Sciences, Clemson University, Clemson, SC

### ADDITIONAL COURSEWORK

- 2020 **ComSciCon Atlanta Area**  
**The Communicating Science Workshop for Graduate Students**  
 University of Georgia at Athens, Athens, GA  
 Developed practical skills and received formal training in science communication. Sharpened oral communication skills and wrote a publication-quality summary of my research for a lay audience. Produced graphics in Adobe Illustrator and connected with current professional science communicators.
- 2019 **Statistical Methods for Functional Genomics**  
 Cold Spring Harbor Laboratory, Cold Spring Harbor, NY  
 Selected among many qualified applicants to attend an intensive residential course on the R programming environment and the statistical methods behind genome-wide analyses of sequencing data. Attained competency in graphic creation and handling large data sets within R.

### PROFESSIONAL EXPERIENCE

- 2018-Present **Volunteer Educator, Division of Education**  
 Greenwood Genetic Center, Greenwood, SC  
 Teaching over 150 middle school and high school students basic molecular biology techniques and enhancing genetic education resources at schools across South Carolina. Developing lesson plans, directing hands-on and virtual activities, and creating original engaging educational materials to teach over 50 high school science teachers about genetics, model organisms, gene editing, biopharming, and bioinformatics with the potential for classroom implementation.
- 2018-Present **Committee Member, Research Initiatives Committee, Graduate Student Government**  
 Clemson University, Clemson, SC  
 Coordinated research-related events on campus for hundreds of graduate students, including Three Minute Thesis competitions and graduate research symposia. Served on committee as a participant and logistics coordinator.
- 2017-2018 **Advisor, Seniors Advising Sophomores in Honors (SASH) Program**  
 Clemson University, Clemson, SC  
 Served as professional, personal, and academic mentor for sophomore students. Engaged in professional and personal conversations with these students, providing advice and a helping hand while discovering their passions and career paths.
- 2015-2016 **Head Counselor, EUREKA! Undergraduate Research Summer Program**  
 Clemson University, Clemson, SC  
 Conducted daily research in synthetic biology (2015) and genetics (2016), planned and executed research program for 33 incoming freshmen, assisted students in navigating difficult personal relations issues with special needs individual

### SERVICE TO SCIENTIFIC COMMUNITY

2020	Judge, Clemson COVID Challenge
2020	Reviewer, Journal of Visual Experiments
2020	Scientist, Skype a Scientist
2020	Judge, American Society of Human Genetics DNA Day Essay Contest
2020	Judge, South Carolina State Science Fair, Region I
2019	Guest Lecturer, Greenwood Homeschool Group

### MEMBERSHIPS AND AWARDS

2019-Present	Member, Genetics Society of America
2019-Present	Member, American Association for the Advancement of Science
2019-Present	Member, American Society of Human Genetics
2018-Present	Member, Clemson University Genetics and Biochemistry Graduate Student Association
2018	Outstanding Senior in Genetics, Clemson University
2017-2018	Savannah River National Laboratory Scholarship Recipient
2016-2018	Member, Phi Kappa Phi Honor Society Member
2015-2018	Member, Alpha Lambda Delta Honors Society, Clemson Chapter
2014-2018	Clemson University President's List

### EXTRACURRICULAR AND COMMUNITY ACTIVITIES

In graduate school, I have found joy in combining my passions for mentoring and genetics while volunteering with the Education Department of the Greenwood Genetic Center. I currently serve as Treasurer of the Edward Via College of Osteopathic Medicine Student Advocate Association. I have served for many years with the homeless community and find joy in serving others. I also enjoy mentoring recent high school graduates through the transition into college as a small group leader and as the founding coordinator of the New Student Experience Team at the Clemson Wesley Foundation. My hobbies include playing intramural volleyball and ultimate frisbee, watching Clemson sporting events, trying new recipes, and singing with friends.

### REFERENCES

#### **Trudy F. C. Mackay, Ph. D., FRS**

Self Family Endowed Chair of Human Genetics  
 Professor, Clemson University Department of Genetics and Biochemistry  
 Director, Clemson University Center for Human Genetics  
 Self Regional Hall, 114 Gregor Mendel Circle, Greenwood, SC 29646  
 tmackay@clemson.edu  
 (864)889-0522

#### **Robert R. A. Anholt, Ph.D.**

Provost Distinguished Professor, Clemson University Department of Genetics and Biochemistry  
 Director of Faculty Excellent Initiatives, College of Science  
 Self Regional Hall, 114 Gregor Mendel Circle, Greenwood, SC 29646  
 ranholt@clemson.edu  
 (864)889-0521

#### **Tzuen-Rong Jeremy Tzeng, Ph.D.**

Associate Professor, Clemson University Department of Biological Sciences  
 Graduate Program Coordinator, Microbiology  
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