

RSC/Presidential Grant Report

Due September 30th of the ending year of the grant

Examples of previous grant reports can be found here: <https://gustavus.edu/kendallcenter/grant-opportunities/grant-examples.php>

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Laura

Last Name *

Burrack

E-mail *

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Date *

MM DD YYYY

07 / 06 / 2020

Please select the grant for which you are submitting a report: *

- Research, Scholarship and Creativity
- Presidential Faculty-Student Collaboration

Presidential Faculty-Student Collaboration Grant Report Details

Please compose your answers offline and copy/paste into the appropriate text boxes. While answers inputted into this form should be available if you close the form and return in the same browser, we cannot guarantee that this function will work.

Please summarize the activities and outcomes of your grant. *

Genome instability causes changes to genetic information that can result in problems ranging from cell death to the development of cancer to acquisition of drug resistance. Microorganisms, such as *Candida albicans*, are particularly useful to study genome stability due to their large population size and the ease in which different conditions and genetic phenotypes can be tested. Additionally, better understanding genome stability in *Candida albicans* is important because the yeast is an opportunistic pathogen capable of causing disease in immunocompromised patients and loss of genome stability is associated with increased antifungal drug resistance.

In our research project funded by our Presidential Faculty-Student Collaboration Grant, Maicy Vossen and I studied the roles of a protein, called Mad2, in protecting the genome in *Candida albicans*. Over the course of the summer, Maicy conducted number of different experiments including growth curves, transformations for strain construction, SNP-RFLP analyses of the genome, and flux assays to quantify rates of genetic change. We collaborated with a FYRE student in the lab, Hanaa Alhosawi, during the summer of 2019. Hanaa conducted additional growth assay and microscopy experiments that complemented Maicy's experiments. Through Maicy and Hanaa's work, we were able to identify new roles for the Mad2 protein in promoting genome stability in our yeast model organism, *Candida albicans*.

Maicy and I also collaborated on data analysis, figure making and manuscript preparation during the time of the grant funding and then continued to finalize revisions of our manuscript during the fall of 2019. Maicy is the first author on this manuscript, published in December 2019 in *Genes*. Additionally, Maicy presented her research on campus and at the Midstates Consortium for Math and Science Undergraduate Research Symposium.

Please explain how you accomplished the goals you set for yourself in your grant proposal. *

Overall, the major goals of our project were to conduct experiments related to characterizing the role of Mad2 in *Candida albicans* and to publish our work. We were successful in both of these major goals. An additional goal of the project was enhancing the breadth of Maicy's research experience in the lab. She conducted a number of different types of experiments that she had not previously done during the summer, learned valuable teaching and mentoring skills through her role as a senior student in the lab, and developed data analysis and visualization methods. The work conducted in this grant also should be beneficial for Maicy's future career as she plans to pursue a Ph.D. in biology.

Please summarize any outcomes (publications, revised syllabi, conference presentations, new research directions, etc.), and discuss your plans for continuing or expanding on your work in this project. *

The major dissemination outcomes of this project were Maicy's presentation at the Midstates Consortium for Math and Science Undergraduate Research Symposium and the paper published in *Genes*. (Vossen, M.L., Alhosawi, H.M., Aney, K.J., Burrack, L.S. (2019) CaMad2 Promotes Multiple Aspects of Genome Stability Beyond Its Direct Function in Chromosome Segregation. *Genes* 10:1013). I had intended to also present some of our work at the Cellular and Molecular Fungal Biology Gordon Research Conference in June 2020, but unfortunately the conference was cancelled due to COVID-19.

Beyond the publications and presentations, this grant had several other positive outcomes. I am certain that the work conducted through this grant were essential for Maicy's success in become a Goldwater Scholar in 2020. Maicy and I also continued to work on taking the project in a new direction to further explore how alteration of Mad2 affects genome evolutionary mechanisms resulting in antifungal drug resistance during January 2020. The role of Mad2 in the evolution of antifungal drug resistance is a new direction for my research lab and forms the basis of a FYRE student project in my lab during summer 2020.

Please discuss your collaboration with your student grantee. What was successful? What aspects of the relationship proved challenging? *

Maicy and I worked very well together and communicated regularly through in-person meetings as well as texts and emails. We had prior experience from her research in the lab through FYRE and a J-term independent study, so I was not surprised that we were able to collaborate successfully. In particular, I think that through this grant, Maicy gained additional independence and confidence (both in her ability to work in the lab as well as teach others). Trying to balance giving Maicy as many opportunities as possible to participate in the manuscript writing and figure preparation with a tight submission deadline was a challenge, but in the end, I think we came up with a balance that allowed us to submit the paper by the due date while also giving Maicy the chance to develop figures independently and contribute to the writing of the manuscript.

Please share any observations about anything else that was important to you and/or any problems you encountered during this grant project about which the Provost's Office should be aware. *

Thanks to the Provost's Office for supporting the Presidential Faculty-Student Collaboration grants. Both my research and Maicy's educational experience were greatly enhanced by the funding.

Research, Scholarship and Creativity Grant Report Details

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Please summarize the activities and outcomes of your grant. *

Please explain how you accomplished the goals you set for yourself in your grant proposal. *

Please summarize any outcomes (publications, revised syllabi, conference presentations, new research directions, etc.), and discuss your plans for continuing or expanding on your work in this project. *

Please share any observations about anything else that was important to you and/or any problems you encountered during this grant project about which the Provost's Office should be aware. *

E-Signature

E-Signature *

Laura Burrack

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