Part II: Project Proposal

Project title — Effects of seizure susceptibility on a complex behavior in *Drosophila melanogaster*
Faculty Mentor — Christopher Jones, Professor of Biology
Student Researcher — Robert Scheirer
Project duration — 10 weeks, Monday June 4 through Friday August 10

Description of the project —

Studying bang-sensitive mutations in the fruit fly *Drosophila melanogaster* has been a long-term focus of my laboratory. Any one of these mutations results in the fly displaying seizures and paralysis upon violent stimulation (e.g. "banging" the container it's held in, thus the name of the mutant class). Although researchers are still at an early stage in the study of these genetic lesions, they hold promise for better understanding human seizure disorders such as epilepsy.

Previous work in my laboratory by Nicole Sabaliauskas showed that at least one bang-sensitive mutant showed defects in a complex behavior, courtship, even in the absence of induced seizures. I am interested in pursuing this observation to better characterize the effects of such mutations on other behaviors in the fly.

Roles and responsibilities —

Robert will be responsible for background research (reviewing what has been published about bang-sensitive mutants, courtship in fruit flies, and Nicole's Honors thesis), growing and maintaining the appropriate fly stocks, planning and carrying out the experiments, and analyzing the results.

My role will be to guide Robert's background research, coordinate the various aspects of the project (I will have a better idea than Robert how much time will be required for the different stages and so will need to plan for how to best optimize the limited time we'll have) and to serve as a voice of experience, having conducted many *Drosophila* behavior projects myself.

Weeks 1–3: Literature research and review; establish fly stocks and begin to collect virgin females for courtship assays, carry out courtship assays with wild-type flies.

Weeks 4–8: Test various bang-sensitive mutants in courtship assays, varying parameters such as age and gender.

Weeks 9–10: Begin to prepare results for presentation at Scholars Day, the NCUR conference, and the Drosophila Research Conference (if appropriate).

Student engagement in discipline-appropriate scholarly research —

The experiments proposed here are all standard for behavioral research using model organisms. Robert will be carrying out the necessary review of the existing literature, familiarizing himself with the behavioral assay, growing and maintaining different mutant fly stocks, testing these stocks, and recording and analyzing his results. Hopefully we will go on to publish his results, which will further expand his experience with discipline-appropriate research.

Student contributions to the discipline —

If the project is successful, I fully expect that we will be able to publish Robert's results, contributing directly to our knowledge of behavior genetics. I also expect this work to suggest further research avenues, contributing indirectly to the discipline but directly to the opportunities for students to carry out research in my laboratory in the future.

I anticipate that Robert's work will be more than sufficient to merit presentation at regional and national conferences. In years past my SOAR students have presented their work at the regional Beta Beta Beta convention (Tri-Beta is the undergraduate biology honor society), the National Council for Undergraduate Research conference, and at the national Drosophila Research Conference.

Part III: Student Statement of Purpose

Project title — Effects of seizure susceptibility on a complex behavior in *Drosophila melanogaster*
Student Researcher — Robert Scheirer, Biochemistry major, expecting to graduate May 2020
Faculty Mentor — Christopher Jones
Housing requested — yes

Since my freshman year of high school, I have always had an interest in the biological sciences. It was then that I decided that I wanted to pursue a career within the medical field. Coming from a family of physicians and nurses, they were more than supportive of my decision. Because of

my family's support and my ever-increasing interest in what happens at the cellular and atomic level, I have decided that the biochemistry major is the path that I should follow.

During my first semester of my sophomore year at Moravian College, I was privileged enough to take Genetics and have Dr. Jones as my professor. It was Genetics that re-introduced me to how interesting and fun the biological sciences can be, which is why I would like to participate in the SOAR program with Dr. Jones.

I first heard about the SOAR program through one of my friends at Moravian during my freshman year. I had never heard of such a thing like research for undergraduates at a college before, and as soon my friend told me about the SOAR program I was instantly interested and wanted to know more. I feel that the SOAR program would be a great opportunity for me to obtain more lab experience as well as give me the ability to see first-hand, what research in the biological sciences is really like. Contributing to the scientific community is something I would very much enjoy doing, and I hope to continue doing so after I graduate. I eventually would like to continue my education by going to medical school, and the experience that I will gain from the SOAR program will greatly benefit me and allow me to be successful in medical school.

I am very interested in investigating the behavior of bang-sensitive *Drosophila melanogastor* mutants during the stages of courtship. Once this research project is completed, I will have acquired a substantial amount of skills, knowledge, and lab experience that will benefit me for the years ahead. I will have learned to properly conduct real lab experiments for future research, and also conduct research within deadlines and overviews.

Part IV: Expense Proposal

Expenses for this project (e.g. routinely-used laboratory supplies, fly food ingredients, specialized equipment) will be covered by the Department of Biological Sciences.