Genetics Graduate Student Association
Conference Award Application
Spring 2022

Please fill out/include the following items and send a .pdf of the entire application GGSA Awards Committee Chair, Brittni Ming-Whitfield (bamw1220@tamu.edu) with Subject: “GGSA Conference Award Application Submission”.

1. Applicant Information.
Applicant Name: Joe Romanowski
UIN: 230009897
Department: Entomology
Email: joeromanowski@tamu.edu
Phone: 908-907-8617

2. Conference Information.
Conference Name: GRC Genetic Biocontrol
Start Date: June 26th, 2022
End Date: July 2nd, 2022
Location (Institute/Conference Center, City, State or virtual): Four Points, Ventura, CA

3. Anticipated Expenses. Please be as specific as possible, and include more rows as necessary.

Expense Item	Cost ($)
Conference registration (room included)	$1240.00
Round trip flight	$606.80
Round trip airport shuttle	$96.00

4. Applicant Statement. Please attach an applicant statement with a brief statement (400 words or less) explaining your reason for attendance at this conference and its impact on your research. Highlight why this meeting is important to your research, what importance this conference has in your field, and how this meeting enhances and relates to your career.

5. Research Abstract. Please attach your abstract for the poster or oral presentation for the scientific conference. Make sure it is tailored to an out-of-field reader, and avoid excessive jargon. This portion of the application is under critical scrutiny and weighs heavily on evaluation of application.

6. Letter of Support. Please attach a letter of support from your primary academic advisor acknowledging your conference participation.

For Administrative Use Only:
Award: Yes____No_ Amount Awarded $_____
President GGSA _____ Primary Faculty Advisor GGSA _____
Treasurer GGSA _____ Secondary Faculty Advisor GGSA _____

1. **Applicant Statement.** Please attach an applicant statement with a brief statement (400 words or less) explaining your reason for attendance at this conference and its impact on your research. Highlight why this meeting is important to your research, what importance this conference has in your field, and how this meeting enhances and relates to your career.

The Gordon Research Conference on Genetic Biocontrol is a conference focused on bringing together researchers investigating genetic systems to control pests and disease vectors. My research in Dr. Zach Adelman's lab is focused on investigating the DNA damage repair pathway to facilitate gene editing (and thus genetic control approaches) in the major human disease mosquito vector, *Aedes aegypti*. This conference highlighted the work of leaders in the field of vector control and helped me understand the research landscape in the field of vector biology. For my project, the molecular mechanisms underlying DNA damage repair are extremely important for my day to day, however the fine details can make me lose sight of the bigger picture of disease control and tropical disease management. With my preliminary exam quickly approaching, attending this conference has given me the perspective I needed to be more confident in how my research can help solve real world problems. Learning and interacting with the leading researchers, developers, and practitioners in my field allowed me to expand my professional network and break out of my project tunnel vision. Most importantly, this conference has shown me where the field of vector control currently is, where it is headed, and how my project fits into the shared goal of eradicating tropical diseases.

Research Abstract. Please attach your abstract for the poster or oral presentation for the scientific conference. Make sure it is tailored to an out-of-field reader, and avoid excessive jargon. This portion of the application is under critical scrutiny and weighs heavily on evaluation of application.

The human disease vector *Aedes aegypti* is estimated to be responsible for 400 million infections each year, including those caused by dengue, Zika, and yellow fever viruses, among others. The use of gene drives, or self-biasing heritable elements capable of spreading to high frequencies within a population, have been proposed to decrease mosquito-borne disease incidence, however addressing uncertainties regarding their persistence in a population, potential for unwanted spread, and unknown ecological impacts are complicated by lack of gene drive control mechanisms. We recently established a method for removing transgenes from *Ae. aegypti* using the single-strand annealing (SSA) pathway of DNA double-strand break (DSB) repair, however, the relationship between DSB site and repair choice in *Ae. aegypti* remains unknown. Here, we designed 11 guide RNAs targeting 4 regions along an SSA reporter transgene at various distances from the repeated sequences and confirmed their activity in vitro using enzyme digestion and in vivo via high resolution melt-curve analysis (HRMA) on both individual and pooled injected embryos. By outcrossing injected embryos and screening their progeny for the wild-type phenotype, we observed CRISPR/Cas9-induced transgene elimination indicative of germline transgene deletion events. Applying melt curve genotyping and sequencing, we were also able to identify deletions

caused by the competing non-homologous end-joining (NHEJ) pathway of DSB repair, allowing us to study the relationship between NHEJ and SSA at CRISPR/Cas9-induced DSBs in the mosquito germline. Results to date indicate that SSA can be triggered even if the DSB break site is several hundred base pairs from the repeated sequences, indicating extensive resection during repair. Further investigating the factors that influence DSB repair and promote SSA-based transgene elimination in mosquitoes can help us design a safer, biodegradable gene drive system to combat tropical diseases.

TEXAS A&M UNIVERSITY
Interdisciplinary Graduate Program in Genetics and Genomics

TEXAS A&M UNIVERSITY
College of Agriculture & Life Sciences

Oct 4th, 2022

Re: Joseph Romanowski,

Awards Committee,

I confirm that I supported Joe Romanowski in attendeing the Gordon Research Conference on Genetic Biocontrol held from June 26th-July1 this past summer.

Please let me know if there is any other information I need to provide to support a travel award from the GENE program.

Sincerely,

Zach Adelman

Chair, Interdisciplinary Program in Genetics and Genomics

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