

Eric Sah

Graduation Year: Junior

College: Science

Major(s): Applied and Computational Mathematics and Statistics

Minors(s): Studio Art

Scholar Group Membership: Beeler Scholar

Did you received other funding for this project?: College of Science

Could you have completed this project without CUSE funding? No

More details on CUSE funding assistance?

Project Title: Systems Genetics Analysis to Identify Gene Candidates Associated with Axon Death in Optic Nerve and Glaucoma

Project Location: Hamilton Eye Institute, Memphis, TN, USA

ND Faculty Mentor: Monica M. Jablonski (Hamilton Eye Institute)

Project Type: Research, Conference - Presentation

Why did you undertake this project/experience? Deepen your knowledge of a topic or issue, Prepare for graduate school (MA or PhD), Prepare for professional school (MD, MBA, JD)

Did your funded experience help you:

[Deepen your understanding of your coursework or field of study]: Very Much

[Discern your interests and post-bac goals]: Very Much

[Become confident in your ability to set and achieve your goals]: Very Much

[Gain a more nuanced view of local, national, or global communities]: Yes

[Improve your written and verbal communications skills]:Very Much

Tell us about your experience.

From April 4th to April 7th, I went to Edmond, Oklahoma to present my research titled "Systems Genetics Analysis to Identify Gene Candidates Associated with Axon Death in Optic Nerve and Glaucoma" at National Conference on Undergraduate Research(NCUR). My research took place at Hamilton Eye Institute, the Department of Ophthalmology of the University of Tennessee Health Science Center during summer. I utilized systems genetics analysis to examine optic nerves of strains belonging to BXD family to identify gene variants associated with glaucoma. Using GeneNetwork, positional candidates were narrowed down under seven criteria using QTL mapping, Pearson correlation, and single nucleotide polymorphisms (SNP). Four gene candidates Apopt1, Cdc42bpb, Klc1, and Tmem179 were identified as genes that modulate axon death in RGCs.

Describe the impact this project had, both on you as a student-scholar and on the people you worked with.

This research project has been important for me to grow analytical skills as a scientist. I had to look at a large population of collected data and make inferences about them. I was able to

narrow down potential candidate genes into just few genes that are highly correlated with glaucoma. This method is listed in Methods in Molecular Biology, and the project that I have worked on is an example of the usage of systems genetics. Similar applications of systems genetics using this method has been published on Nature Communications as well by our lab.

Describe how this experience is connected to your plans as a student or future professional.

While I have done poster presentations before at College of Science Joint Annual Meeting before, I have never done an oral presentation before. Communicating scientific research and information to another scholar group will be a very important skill for me to have as I pursue MD or MD/PhD, and this experience helped me practice delivering information more effectively and confidently. Furthermore, I had a chance to listen to undergraduate scholars from a variety of background and colleges to present research in their respective area of study which ranged from art and history to science and math. As an Applied and Computational Mathematics and Statistics major, I learned more about how math can apply to medicine as well as different mathematical methods. As a scientist, I was able to learn unique experimental questions and different methods of studies from a wide variety of different disciplines to carry out the research.

What advice would you give other students who are planning to pursue similar projects?

I highly encourage students to try to present their research outside of Notre Dame where they can learn from scholars outside of Notre Dame as well as from other disciplines. There are many faculties and various resources on campus that will help guide you along the way that you can take advantage of.

I acknowledge that this form has been filled out truthfully and to the best of my ability. I understand that this information will be shared with many different CUSE constituencies. As such, I have provided as much useful information as I was able. I understand that CUSE will not complete my award disbursement until this form is successfully completed. If I have any questions or concerns, I will contact CUSE before submitting this form. To illustrate that you understand all of these points, please enter your Notre Dame email in the box below.

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