

AG2PI SEED GRANT - PROJECT FINAL REPORT

PROJECT NAME	Leveraging single-cell genomics in QTL mapping
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PROJECT PRINCIPAL INVESTIGATOR	TODAY'S DATE	PROJECT START DATE	DATE OF COMPLETION
Susanta Kumar Behura	10/17/2023	6/1/2022	8/31/2023
TEAM MEMBERS (co-PI, co-I, personnel)	COLLABORATORS		
Jared Egan Decker, Ananya Samal	David Kang, Suresh Nair		

NOTE: this report will only be shared with the AG2PI Executive Board and USDA.

ACCOMPLISHMENTS

Please provide a short summary of the conclusions (both successes and failures) made from your project. Include a description of how this project will provide benefits to the agricultural genome to phenome community and, possibly, to a broader audience. You should include both qualitative and quantitative details, as necessary, to support your conclusions. Include a short accomplishment statement in non-technical language and do not include names.

This is not a technical report. Please keep to no more than 6-8 sentences (e.g., 1-2 sentences per point, above).

Successes: 1). We have established a highly collaborative team with Drs. Kang and Nair to perform single-cell genomics research on rice, fruit fly and swine. We have developed required skills, samples, and preliminary data to write an USDA AFRI proposal on swine reproduction (Behura as PI), and another *Drosophila suzukii* (Kand as PI) . 2). A graduate student in Behura lab was trained in single cell genomics. He has been invited to make a presentation of "Application of Single-cell Genomics in Agriculture" to Ag policy makers at the "Communicating Agriculture Beyond Academic Program" conference on October 19, 2023 at the University of South Dakota

Failures: 1). We faced challenges in developing a database and training workshop for AG2PI community that we originally planned. The reason was related to personnel recruitment. The web designer we hired left for another job. We tried our best to perform the work with a part-time worker. But we couldn't finish the work despite we were given an extension of time.

(HINT: You can expand sections as necessary by pulling down on the square in the lower right corner of each box)

Products

Please list any products from this project. This may include (but not limited to) publication, concept/white paper, workshop, conference presentation, website, publicly available data or pipelines, etc. Reminder: you are required to make your products available to the broader stakeholder community using standard USDA practices, open source, FAIR, or other models. Metrics may include number of participants or times accessed, etc. Include links to recordings, DOI, etc. when possible. For presentations and posters, provide authors, date, location and presentation title.

ACTIVITY / PRODUCT	DESCRIPTION (include URL, if applicable)	OUTCOME / METRICS
Poster Title: Leveraging single-cell genomics in QTL mapping	Genome to Phenome (AG2PI) Conference, Kansas City, US: June 15-16, 2023	
Talk Title: Application of Single-cell Genomics in Agriculture	Communicating Agriculture Beyond Academic Program Conference, Sioux, South Dakota, October 19, 2023	
Talk Title: Modeling sex differences in metabolic regulation between placenta and fetal organs	Metabolomics Association of North America (MANA) 5 th Annual Conference, Columbia, MO, October 23-27	

Audience

With whom has this work been targeted to and shared? Please describe how this project and its products have been disseminated to a community of interest. Include any outreach activity or information sharing as well as training or professional development opportunities provided in this project.

In this project, we targeted researchers working in the areas of plant, animal and insect sciences. Our work has established a pipeline to use whole genome sequence data and single-cell RNA-seq data to identify eQTLs linked to the trait of interest at the single cell level. The PI lab has trained a graduate student to run the pipeline and demonstrate its application using preliminary data. We have also shared the pipeline with the collaborators' labs.

CONTINUATION OF WORK

Next steps

How do you/your team plan to continue moving this project forward? Include how AG2PI can assist in your forward momentum.

We are currently working on writing grant proposals to USDA on single cell genomics. We also continue with our efforts to develop a website that will serve as a resource hub for single-cell QTL mapping in agricultural research. Once the site is active, we will need AG2PI to assist disseminate the information to the AG2PI community.