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Application Summary

Competition Details

Competition Title:	Spring 2024 CURO Research Award
Category:	
Cycle:	

Application Information

Submitted By:	Emre Aliya
Application ID:	2514
Application Title:	Emre Aliya Astronomy Project

Personal Details

First Name:	Emre
Last Name:	Aliya
Application title:	Emre Aliya Astronomy Project
UGA Student ID (81x):	811523853
Preferred Name:	Emre Aliya
UGA MyID email address:	eaa56022@uga.edu
Year in school as of Fall 2023:	1st year
Expected graduation date:	Spring 2027
Major(s):	Computer Engineering
Major(s) College(s):	College of Engineering
Current cumulative GPA:	N/A
Are you currently a member of the Morehead Honors College?:	No
Have you presented research at the CURO Symposium? :	No

If yes, please list each year you presented

Have you previously received a CURO Research Award or CURO Research Award?:	No

If yes, please list each semester and year you received an award

Are you currently enrolled in or have you previously completed a CURO Research or Thesis course?:	No

If yes, please list courses. Include prefix, course number, and semester taken

To help us determine financial need, please explain how you are paying for tuition, and please list any financial aid or scholarships you are currently receiving, including student loans::	I am paying tuition through the zell miller scholarship, maximum subsidized loans, some unsubsidized loans, and the pell grant.
Faculty Mentor Last Name:	Weliweriya
Faculty Mentor First Name:	Nandana
Faculty Mentor's UGA email address:	Nandanaw@uga.edu
Faculty Mentor's Department:	Department of Physics and Astronomy
Faculty Mentor's College:	Franklin College of Arts and Sciences

Research Title

Exploring Virtual Reality in STEM Education: Enhancing Student Understanding through Immersive Learning Environments

When and how frequently will you meet with your mentor?

1-2 hours once every week, Monday, Wednesday, or Friday

Does your research involve human subjects:	No
Type your full name below to indicate you are aware of the CITI and IRB requirements:	Emre Aliya
Does your research involve domestic or international travel?:	No travel

Emre Aliya
Research Proposal

I had the privilege of collaborating with Dr. Nandana Weliweriya on an exciting project where we're developing a simulation of our solar system using Unreal Engine. We are also developing a similar project utilizing Blender. Blender allows for immense customization and is light on the computer, but with that comes slower rendering speeds and stutters in animation. Unreal Engine provides the most realistic scenes but is greeted by a complex user interface and extreme workload on hardware. With that in mind, these parallel initiatives allow us to explore different tools to create the most optimal experience in modeling the solar system.

With Dr. Weliweriya's guidance, we've come up with a blueprint to replicate a solar eclipse first in a 2D simulation then in a 3D environment using 3D VR goggles. We hope to offer students the opportunity to select any location on Earth and watch a solar eclipse in real-time. The simulation will also offer statistics on asteroids and predictions based on the data collected. As for the user interface, we've looked into developing a website to help users navigate through the simulation.

As our project advanced, I wrote detailed documentation so anyone could readily replicate our work. The documentation incorporates critical details such as computer specifications, engine version requirements, and step-by-step instructions to recreate our work. In the next phase, we plan to incorporate visuals, such as images and videos, to show the progress of the project as it's developed. Documentation will help to create articles and design presentations for the CURO symposium.

I've been tasked with modeling each planet and calculating its orbital patterns, rotations, speeds, and axes. I've also set up the space environment to hold the solar system in Unreal Engine. The models were then fitted with textures from *Solar Textures* to make the system more genuine. Looking ahead, we intend to use the simulations we've developed as an educational resource available to the astrophysics and physics departments. Giving students the ability to interact with the environment can give them a better understanding of what they're learning which is one of the primary objectives of the project. We will continue to work in a professional manner with guidance from Dr. Weliweriya to grow the project into an actual usable resource.

Emre Aliya

Personal Statement

The University of Georgia offers many opportunities to further gain experience as I continue to work toward my degree in Computer Engineering. In addition to the short-term goal of developing the Astronomy Project, I hope to gain more experience in firmware and software to build my resume and obtain a software engineering internship in the long term. Luckily, I reached out to Dr. Weliweriya to participate in a project that utilizes both game engines and Python programming. The use of game engines taught me more about the limitations of hardware while running different types of engines. Blender runs smoothly on an i5 Intel processor, while Unreal Engine requires something more powerful.

While developing the project, there were beneficial aspects of programming that actually helped with my career goal of becoming a software engineer. Project planning and management are important in long-term projects which set milestones and managed requirements for the project. Version control and algorithm design were also used in the complex calculations of the planet's physics. To add customizable aspects to the simulation, UI and UX designs are in development for interaction.

These are mostly the technical components of the project, but collaboration with others is also one of the major components of software engineering. It's impossible to build something impactful without the help of others. In our project, I communicate with my roommate, who is working on the blender part of the project, to talk about different ideas and adaptations to software.

In sum, the Astronomy project we are developing not only teaches me the technical aspects of software engineering but also gives me experience in what it's like working on a professional team.

Review Form

Spring 2024 CURO Research Award

Routing Step:	Faculty mentor UGA email address
Application Title:	Emre Aliya Astronomy Project
Application ID:	2514
Review Deadline:	11/10/2023 11:59 PM

***Your Comments:**

As an undergraduate CS major, Emre plays a vital role in an interdisciplinary project that spans prominent institutions, including the UGA Physics & Astronomy Department, College of Engineering, and College of Veterinary Medicine. The project's central objective is the creation of "Scientifically Correct, Immersive, Engaging, Visually Stunning, and Modular" 3-D astronomical simulations, designed to enrich students' grasp of fundamental astrophysical concepts. This immersive, hands-on learning opportunity positions Emre as an excellent candidate for the CURO research awards, given her capacity to engage in substantial experiential learning.

***Please indicate whether you approve or do not approve this application moving forward in the competition.:**

I Approve