1. Project description

The purpose of this proposal is to seek funds to support the writing, preliminary data collection and submission of a NSF implementation grant in November of 2026. This secondary external grant has the ultimate goal of the creation of a novel VR education environment for STEM students. NSF implementation grants are multi-million dollar grants which are designed to push forward large institutional efforts that increase the number of STEM graduates.

Background:

It is well established that minorities are significantly under-represented in Science, Technology, Engineering and Math (STEM) careers which is often attributed to talented students being lost prior to graduation with a STEM degree. Even when students do graduate within the STEM fields, they are often starting behind due to gaps that have occurred in their educational experiences. Partly this is due to lack of research opportunities and emersion in applied STEM activities. Recent advances in education technology have pushed the boundaries on how to best educate students. These advances include the incorporation of Virtual Reality and Augmented reality to teaching of a variety of STEM fields such as: Engineering, Biology, Chemistry, Physics and Forensic Science. This proposal seeks to address this particular need at Lincoln University.

Proposal:

I am seeking to establish a Virtual Reality STEM facility on campus which will ensure our students will have access to cutting edge education opportunities, which incorporate the best technology available on the market. This will promote collaborative learning and make sure students

An endeavor of this magnitude can not be undertaken without significant support. Thus, I am seeking starting funds to assist with the exploration of the feasibility of the concept of incorporating this educational experience at Lincoln University. This exploration will be followed up with the submission of a governmental grant which will fund the final pieces (and most expensive parts) of the project. The first step of such a project, would be to coordinate with an institution or facility who has been successful. One such location which has implemented this type of technology is Rowan university. Through a collaboration through CETL, I will work with representatives of Rowan University to get exposure to virtual reality laboratories, specifically with their current Dreamscape technology. The talks to start this process have begun, and the university is willing to assist. To aid in this collaboration, the Lincubator has offered some trial VR equipment to start the training. However, at least some new modern equipment would need to be purchased to complete the training to properly interface/integrate with the Rowan university systems, and has been budgeted.

After a successful trial of the software, equipment and determination of feasibility, we will then submit a significantly larger grant to the NSF. This type of funding has been requested and successful at other HBCU's previously, such as Savannah State University. As part of the grant writing process, background information, database mining, and reference sourcing will occur. Furthermore, writing on this grant will require significant time working with the sourced provider of the systems, regardless of if its Dreamscape, VictoryXR, WorldViz, Immersive Science or some other provider. As part of the writing, I will coordinate with OIERP and other on-campus offices to make sure we have proper data/statistics to ensure we have a high chance of success. Lastly, being this is such a large project(and big financial ask) the actual writing of the grant is expected to take 3-4 weeks, which is slated for the month of July.

In a short summary of the future grant, this future grant will seek funds to remodel/renovate multiple rooms, so they are VR capable, purchase and install STEM focused VR hardware, and institute training for faculty across multiple disciplines on how to use the software/facilities which includes training seminars and workshops

Personal Quality:
As a professor in the sciences, I have always sought new ways to educate students. Specifically, I have pushed the department and the university to be more innovative in the ways of teaching the Biological Sciences. This can be highlighted by my previous Faculty development grants which focused on identifying ways in conducting laboratories from a remote setting. These studies were highly successful and were ultimately used to assist the department (and others) through the unfortunate remote times thrust upon us by the COVID-19 Virus.

Ultimately, I vision that the dreamscape or similar a similar quality facility would be installed at the university. Prior to that time, we need training, technology and the space put into practice. This proposal seeks to address that need.

2. **Goal and objectives:**
The goal of this grant is to experiment with VR equipment and software which then be included in an implementation grant to be submitted to the NSF.

3. Timetable:
Preliminary testing of software and related activities will be completed in June 2026. Preparation of the finalize grant will be completed in July 2026.

4. How the project will enhance teaching and research at Lincoln University:

Intellectual merit:
This project and the final grant, when funded, will reform STEM curriculum through the use of advanced 3D visualization and emersion in advanced laboratory techniques and experiences. The innovative techniques being explored in this proposal will bring an entirely new element to STEM education at Lincoln University. This will result in a more thorough educational experience for our students. It is anticipated that the final project will help retain and better educate under-represented students in applied STEM activities. Ultimately, the end goal will be to best prepare Lincoln University for their STEM careers.

Broader Impacts:
As we have seen in the past few months, issues can arise with traditional education methods when the facilities which house items such as wet laboratories and equipment get shut down, either due to health risks such as COVID-19, or building shutdowns due to cold weather and pipes bursting as just recently happened on our campus. Having access to VR education methods would permit an easier pivot to more futuristic educational experiences and will ensure that our students can seamlessly continue their education in times of an emergency.

5. Outcome Measurement:
A successful outcome of the grant will be measured with the submission of the Implementation grant in November.

6. Dissemination:
Results of the grant will be filed with the Faculty Development Committee and Faculty Affairs as required. Further, I will present the results of the project in Spring through CETL.