



## Sponsoring Scholars in Science Awards

### Seedling Research Funding

Propose your ideas for engaging and inspiring students to pursue science, technology, engineering and mathematics (STEM). Funding will be provided for compelling K-12, higher ed and educational research initiatives designed to build student interest and awareness in the STEM disciplines.

### Code 34

### Topic: Making Physics Fun Through Immersive Discovery Learning

**Objective: To provide students with immersive and interactive tools for exploring the fundamental laws of physics and how they impact the world around us**

**Description:** The mathematic principles underlying the laws of physics may be complex, but children actually begin learning these concepts (e.g., Newton's laws of motion) at an early age in their daily interactions with their surroundings. Bridging the gap between this innate ability to infer fundamental physics

relationships without understanding the principles behind them—and the ability to represent these physics relationships mathematically—requires “discovery learning.” In the discovery learning process, learners are provided with a basic set of principles and allowed to identify their limits and extensions by applying these principles to many different situations. Applied to physics, discovery learning paves the way for learners to develop a more abstract understanding of the principles being taught, leading to the ability to formalize them into the rules we typically associate with physics.

Discovery learning requires learners to be fully “immersed” in the problems with which they are working. Recent advances in computing systems, visual displays, force and haptic feedback gloves, and computer-generated imagery software allow—for the first time—the possibility of inexpensively developing a fully immersive, interactive educational tool that allows students to dynamically learn about physics in a multi-sensory manner. Successful technologies will leverage and integrate these advances, as well as enable students to script their own unique learning scenarios, in a tool designed to operate on a laptop, PC or tablet. The desired capability should be applicable primarily to grades K-4, but could also support extensibility to more mathematics-based physics lessons for grades 5-7.

**POC:**

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