



## Future Faces of Physics Award Proposal

<b>Project Proposal Title</b>	ISU Physics Tutoring Program
<b>Name of School</b>	Illinois State University
<b>SPS Chapter Number</b>	3057
<b>Total Amount Requested</b>	\$500.00

### Abstract

The Illinois State University SPS chapter will be providing virtual tutoring and mentoring services to students who identify with underrepresented groups in physics to increase retention rates for these demographics. This program is especially timely due to the inequalities in access to education that have been exacerbated by the COVID-19 pandemic.

# Proposal Statement

## Overview Of Proposed Project

### Project Description

The Illinois State University (ISU) Physics Club in conjunction with the Women in Physics (WIP) Registered Student Organization (RSO) will work to provide virtual tutoring and peer-mentoring services to students from traditionally underrepresented<sup>1</sup> groups within the physics major. The project will consist of weekly tutoring sessions (either group or 1:1 sessions) between WIP/Physics Club members and first year students virtually over a Discord server (similar to Zoom in functionality, but with the added feature of permanently open text and voice chat rooms), in addition to monthly developmental programs including faculty and staff. As a result of these tutoring sessions, first year students will be connected with third/fourth year students acting as mentors who they can forge connections with to obtain guidance as they progress through the major.

### Goals of the Project

1. Increase major retention rates by providing 100 hours of tutoring spread across at least 10 students from underrepresented backgrounds
2. Provide near-peer mentorship and develop relationships between upper-level students and first year students to help first year students assimilate into the departments culture
3. Promote academic success via weekly tutoring and monthly developmental sessions

### Background and Motivation

This project is motivated by the staggeringly low<sup>2</sup> proportion of students from underrepresented groups awarded bachelors degrees in physics. We aim to address this issue by providing free major course tutoring to students identifying with this population, in addition to peer-mentorship opportunities. ISU Physics Club is the mainstay for physics majors, either when needing tutoring services or looking for a place to call home within the department. Its tutoring services have traditionally been the lone provider of free calculus-based physics tutoring on campus, but due to the impact of COVID-19 on students, the club has been unable to provide this service at its normal capacity. This service is needed even more so this year as students who have extended absences due to the virus have difficulties catching up upon return, potentially leading to a failed semester that a couple of tutoring sessions could have easily prevented. It has also been difficult to maintain the same level of community as it has had in the past due to meetings in person becoming restricted. Progress has been made to amend this, but more work needs to be done.

In previous years, tutors offered their services on a volunteer basis and normally tutored between 2-3 hours per week. Students would frequently show up with questions and leave feeling more prepared in their major courses. In addition, many would find a new friend in the department or meet someone who is able to glean some general advice relating to traversing through the major. However, finding students willing to volunteer their time for tutoring this year has been difficult. Due to COVID-19, many of our previous tutors have had to take on more hours at their paid jobs due to stresses brought on by the pandemic. To bring the tutoring service back to full capacity, we plan on providing our tutors with an hourly paid position. This will allow tutors to resume their previous tutoring hours without worry, and continue to enrich both the tutors and tutees as before.

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<sup>1</sup>Such as those that identify as Female, Hispanic, Latino, Black, African American, Native American, LGTBQ+

<sup>2</sup><https://www.aip.org/statistics/data-graphics/proportion-physics-bachelors-degrees-awarded-african-americans-and-0>

To do so, all physics majors will be offered the opportunity to participate in weekly virtual tutoring sessions. Priority for signing up for these sessions will be given to students from underrepresented groups as they are poised to gain the most from this program. The program will be advertised through appropriately related diversity groups on campus and to professors teaching physics major courses, in addition to being sent through the physics major LISTSERV. Students will be able to fill out a form denoting their availability for a session, and denote a preference for who they would feel most comfortable being tutored by from a given list. Some students interested in taking advantage of a service such as this were previously polled and have indicated that the background of their tutor is a major factor into how effective tutoring sessions would be to them. To accommodate for this, tutors will provide a brief diversity statement where they will be able to describe their background in as much detail as they feel is relevant to the position and feel comfortable sharing so students can choose a tutor that would benefit them the most.

Tutors will be trained on how to effectively form peer-mentorship relationships between themselves and their tutees via an article<sup>3,4</sup> reading and discussion session before tutoring services officially begin. Having a mentor who students can rely on and closely relate to is critical<sup>5,6</sup> for retaining students within the major as attrition rates are closely tied to how a student perceives their environment. This environment includes faculty and staff members as well. Faculty/staff-student relationships will be promoted during monthly developmental sessions, where the two groups will be interacting together outside of the classroom in a more casual environment. These monthly meetings will grant students the opportunity to gain information beyond that normally obtained within the classroom setting, such as receiving career advice about attending graduate school.

## How Proposed Activity Promotes Physics Across Cultures

Currently at ISU, there are several RSOs that work to promote diversity across campus. However there are few that seek to promote it within the sciences, arguably one of the places where it is needed most. This project seeks to fill that void on campus by promoting diversity specifically within the Physics Department and ensuring that all students needs are met.

One such need is for there to be mentors for students to identify with in their field. As students progress onto higher levels of education the number of role models coming from underrepresented groups tends to decrease, especially within the sciences. While there has been some work done to combat this statistic in recent years, the effects have not had their full impact yet, and the problem remains. This program will assist with that fight, and will continue to motivate and retain students identifying with underrepresented groups. Since WIP and Physics Club are working together on this project and are composed of members from several different underrepresented groups in science, together the RSOs will be able to serve as role models for students to relate to.

In addition, Illinois State University's Center for Mathematics, Science, and Technology (CeMaST) has already agreed to contribute resources (\$600 to match) and mentorship in support of this program. CeMaST has previously run a number of initiatives in the past promoting diversity within the sciences, and will help ensure this program will run as smoothly as possible. For example CeMaST <sup>7</sup> currently runs STEM Alliance and NexSTEM, programs that both work to increase opportunities that are available to students who identify with groups that are largely marginalized and minoritized by many in STEM fields.

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<sup>3</sup><https://www.insidehighered.com/views/2020/09/08/encouraging-sense-belonging-among-underrepresented-students-key-their-success-stem>

<sup>4</sup><https://www.insidehighered.com/advice/2020/01/13/advice-mentoring-underrepresented-minority-students-when-you-are-white-opinion>

<sup>5</sup><https://www.aip.org/diversity-initiatives/team-up-task-force>

<sup>6</sup><https://doi.org/10.1353/csd.2020.0061>

<sup>7</sup><https://cemast.illinoisstate.edu/students/college/index.shtml>

# Plan for Carrying Out Proposed Project

## Personnel Involved:

**Harold Diaz** [Physics Club President, SPS Member]

### Responsibilities:

1. Advertising tutoring services around the physics department
2. Connecting with diversity advocacy groups on campus

### Related Skills/Expertise:

1. Current tutor for Physics Club; can assist with training new tutors

**Katie Crook** [Physics Club Treasurer, WIP President]

### Responsibilities:

1. Communications with Dr. Rebekka Darner from CeMaST, who will be in charge of the tutors, hiring and pay
2. Organizing tutor resources
3. Advertising tutoring services directly to WIP members

### Related Skills/Expertise:

1. Formerly a tutor for the Julia N. Visor Academic Center on campus for non-major physics courses

**Brighton Coe** [Physics Club Vice President, SPS Member]

### Responsibilities:

1. Coordinating tutoring services
2. Creating website allowing tutees to signup for tutoring services & denote preferences

### Related Skills/Expertise:

1. Currently a tutor for the Julia N. Visor Academic Center on campus for non major physics courses

**Ian Freeman** [Physics Club Secretary, SPS Member]

### Responsibilities:

1. Communications with Dr. Matt Caplan, the Physics Club advisor who will assist with coordinating tutoring services
2. Keeping track of tutor hours & in charge of activity evaluation plan data collection

### Related Skills/Expertise:

1. Formerly a tutor for the Julia N. Visor Academic Center on campus for non major physics courses

## Project Timeline

12/14/2021 - 1/29/2021	Hire tutors & complete necessary training/paperwork [1] Create website for students to sign up for tutoring sessions Tutoring introduction surveys created [2]
1/11/2021	Sign up website completed & advertising materials prepared [3]
1/11/2021 - 1/29/2021	Spring 2021 semester begins Begin advertising for tutoring through diversity groups [4], major courses, Physics Club & WIP, physics major LISTSERV
1/29/2021	Tutoring services begin
2/7/2021 - 2/13/2021	First developmental program with faculty & staff [5]
3/7/2021 - 3/13/2021	Second developmental program with faculty & staff [6]
4/11/2021 - 4/17/2021	Third developmental program with faculty & staff [7]
4/17/2021	Tutoring conclusion surveys created [8]
4/25/2021	Tutoring surveys sent out to tutors & tutees
4/30/2021	Tutoring surveys collected Tutoring services end
5/1/2021	Spring 2021 semester ends Final report creation begins
5/31/2021	Final report due to SPS

[1] Tutors will be required to have taken the course they plan on tutoring and have achieved a passing grade within it. Minimum GPA requirements TBD based on CeMaST hiring requirements.

[2], [8] See *Activity Evaluation Plan* for further details

[3] Advertising materials will consist of digital flyers to be dispersed via email, as few classes are currently planned to be in person next semester

[4] Planned RSOs include but are not limited to APAC, ALAS, BSU, & Pride

[5] Most likely a meet & greet with faculty & staff members, exact details TBD

[6] Most likely a professional development program, exact details TBD

[7] Most likely a professional development program, exact details TBD

## Activity Evaluation Plan

A Qualtrics<sup>8</sup> survey at the beginning of the program will be sent out asking students:

1. How confident do you feel in your major courses?
2. How connected do you feel to the community within the Physics Department?
3. How accessible are resources (peers, faculty/staff, etc) for success readily available to you?

Responses to these questions will be Likert-scored so pre/post responses can be compared with a t-test. The same questions will then be asked again at the end of the program in addition to the following questions:

1. How effective do you think the tutoring you received this semester was?
2. How often were you able to form new friendships/mentor relations as a result of tutoring this semester?
3. Do you think that this tutoring program can improve its services in any way?
4. Do you feel the physics department has areas in which it could improve?

These results will be included in the final report for SPS. Any key recommendations provided by students will be forwarded to the appropriate members of the physics department and/or taken into consideration for next time.

## Budget Justification

As mentioned previously, ISU Physics Club is the lone provider of free calculus-based physics tutoring available on campus while simultaneously being a place many students find mentorship opportunities. COVID-19 has made it difficult to provide the same level of tutoring and mentoring that has been offered in the past. Providing tutors with an hourly paid position will bring this program back to its previous level, as volunteers will no longer see it as an extra stressor to their daily lives on top of the currently ongoing pandemic. Tutoring will have an emphasis on outreach to students from underrepresented groups by encouraging the formation of peer-mentorship relationships to increase retention within the major.

CeMaST has offered to provide \$600 in matching funds making the total budget for this program \$1100 for the spring semester. This funding will allow 5-7 tutors each working 1-2 hours a week for the planned 14 weeks to be hired on and paid at \$11.00 an hour<sup>9</sup>. In other words, this will provide for 100 hours of tutoring over a 14 week period.

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<sup>8</sup><https://www.qualtrics.com/>

<sup>9</sup>Illinois' minimum wage is set to change to \$11.00 an hour for 2021, from the current \$10.00