



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Future Faces of Physics Award Proposal

Project Proposal Title	Open Physics Pathways
Name of School	Universidad Autónoma de Querétaro
SPS Chapter Number	7538
Total Amount Requested	\$500

Abstract

The SPS Chapter at Universidad Autónoma de Querétaro proposes *Open Physics Pathways*, an inclusive online education system offering video lessons and study materials for high-school, early-college, and pre-graduate students. Motivated by post-pandemic learning gaps, this project supports underrepresented students in rebuilding foundational skills and advancing confidently in physics.

Proposal Statement

Overview of Proposed Project/Activity/Event

Open Physics Pathways is an online, open-access educational system designed to support students across three critical stages of the physics academic pipeline:

1. **High-school students preparing for university entrance.**
We will produce short, clear video lessons and guided notes covering algebra, trigonometry, and introductory general physics—topics essential for university admission exams.
2. **First-year physics majors.**
We will create structured content for differential calculus, linear algebra, and an honors-level introductory mechanics course modeled after *Kleppner & Kolenkow's Introduction to Mechanics*. These materials will help students overcome foundational gaps and succeed in mathematically rigorous physics courses.
3. **Undergraduate students preparing for master's admissions.**
We will record advanced problem-solving walkthroughs focused on classical mechanics and electromagnetism, quantum mechanics, and statistical physics, helping underrepresented students prepare for competitive graduate applications.

The goals of this project are to:

- Provide **high-quality**, freely available physics instruction tailored to students with limited academic support.
- **Strengthen retention** of students from historically underrepresented backgrounds in physics.
- Build a **sustainable educational resource** that future SPS members can expand.
- Create a **supportive learning pipeline** from high school to graduate school.

How Proposed Activity Promotes Physics Across Cultures

This project aligns directly with the mission of the *Future Faces of Physics Award* by promoting equitable access to physics education across cultural, socioeconomic, and institutional divides.

Many underrepresented students lack access to strong academic preparation, particularly after the pandemic. By creating a freely available collection of clear, high-quality physics lessons:

- **High-school students** from underserved communities gain the preparation needed to apply to university STEM programs.
- **First-generation and minority physics majors** receive structured support that improves their retention in physics during the most challenging early semesters.
- **Undergraduates** with limited access to advanced preparation resources, gain tools to compete fairly for graduate admissions.

The project promotes physics across cultures by:

- **Reducing learning inequalities** created or intensified by the pandemic.
- Offering **culturally accessible materials** available asynchronously, benefiting students with work or family responsibilities.
- Creating a pathway that helps students **overcome structural barriers** and remain in the field.

In doing so, Open Physics Pathways fills a critical void in our community and offers meaningful, practical support to students who are historically excluded or disadvantaged within physics.

Plan for Carrying Out Proposed Project/Activity/Event

Personnel

- *The UAQ SPS Board* is responsible for planning, content creation, and supervision.
- *SPS Video Team (3–6 SPS members)*: Assisting with scripting, recording, digital note preparation, editing, and uploading.
- *Faculty Mentors*: Two or more physics instructors providing academic review of materials.

Outreach and Marketing

- Collaboration with local public high schools serving underrepresented student populations.
- Announcements through the university and SPS social media, and campus groups supporting minority and first-generation students.
- Promotion through physics departmental channels and tutoring programs.

SPS Member Participation

- Expected: 5–10 SPS volunteers assisting with recording, editing, outreach, and mentoring.
- Additional volunteers recruited through student tutoring centers and peer-learning programs.

Expertise

Our SPS members have experience tutoring high-school and early-university physics, familiarity with advanced undergraduate problem solving, and technical skills in video editing, digital annotation, and LaTeX.

Project/Activity/Event Timeline

January – February: Finalize topic lists, scripts, and structure for all three academic levels; and begin recording initial and publish the first set of videos.

March – April: Edit and publish the second set of videos; create guided notes and exercise sheets; and conduct outreach to partnering schools.

May: Conduct evaluation surveys and compile metrics; submit final report to SPS.

Activity Evaluation Plan

The success of *Open Physics Pathways* will be measured through both participation metrics and qualitative feedback.

Quantitative metrics:

- Number of video views and downloads of study guides.
- Number of students and schools reached.
- Participation in workshops or support sessions.
- Number of students accessing materials for university or graduate exam preparation.

Qualitative metrics:

- Anonymous surveys evaluating clarity, accessibility, and perceived usefulness of materials.
- Open-response feedback from teachers and students regarding improved confidence or understanding.
- Reflections from SPS members and faculty mentors on the academic impact of the project.

We will also compare student self-reported confidence and preparation levels before and after using the materials. Key indicators of success will include improved comprehension of physics topics, reduced anxiety around STEM coursework, greater engagement from culturally diverse groups, and increased interest in STEM academic pathways.

Together, these measures will allow us to evaluate how effectively the project promoted physics across cultures and reduced post-pandemic educational inequities.

Budget Justification

We are requesting funding of **\$500** to create high-quality, accessible educational content. We request funds for essential recording equipment and limited outreach materials.

These items directly support the goals of the FFoP Award by enabling the creation of high-quality educational resources serving culturally diverse and historically underrepresented students. Our SPS chapter will contribute all volunteer labor, use existing editing software, and provide faculty academic review as in-kind support.