



SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics

Marsh W. White Award Proposal

Project Proposal Title	Sailing into Fluid Dynamics
Name of School	Arkansas Tech University
SPS Chapter Number	0258
Total Amount Requested	\$500.00

Abstract

Arkansas Tech University's chapter of SPS will be hosting a Cardboard Boat Regatta! Students from the College of STEM, the High School, and community members in Russellville are encouraged to design and build cardboard boats to compete in the race, forstnering teamwork while using principles of fluid mechanics and engineering.

Proposal Statement

Overview of Proposed Project/Activity/Event

A cardboard boat regatta is a fun, hands-on event where participants design and build boats entirely out of cardboard and tape, then race them across a body of water. The city of Russellville hosts many community events that often bring a crowd and, following the April 2024 total solar eclipse, our chapter has been working on getting involved with the Russellville community in said events. For this project, the inspiration came from our chapter advisor, who was a member of a swim team.

Our goal in this project is to encourage experimentation and curiosity amongst members of our community of all ages. Firstly, the boat race encourages participants to go through the engineering process and figure out how to optimize various fluid mechanic principles. Secondly, some of our members plan to host fluid mechanics demos at the race itself, allowing participants the chance to learn how physics plays a role in their design.

Given the favorable reputation of the Russellville Aquatic Center, it was an ideal location to engage the community interested in water-related activities and reach members of the younger generations. Due to the teamwork and creativity involved, the event also serves as a fun teambuilding exercise families, friends, and colleagues would be interested in; our target audience are those community members. Additionally, we plan to invite members of our College of STEM and members of the Russellville High School engineering and physics classes to participate, giving them the opportunity to apply the skills they're learning in class to the real world and encourage those that might be interested in Physics to further explore the subject at ATU.

How Proposed Activity Promotes Interest in Physics

When learning about physics in a classroom or lecture based setting, the emphasis on equations and theoretical planning can often dissuade students from continuing study. However, the practical application of physical principals is often regarded as much more enjoyable and more accessible to the average person, serving as an ideal gate to attract interest. As mentioned, Russellville hosts many events, but nothing like a boat race, thereby making it unique and more likely to attract participants. Throughout a participant's preparation for the race, they are incentivised to explore principles of fluid mechanics such as surface tension and buoyancy, as they try to find the optimum way to build a boat. The participant may go through this consciously or subconsciously, but for either case, displays of each of those principles will be at the actual event itself, giving participants the opportunity to learn more about why a particular aspect seemed to work so well. For many of the Russellville citizens, physics education is not accessible like this, thus giving them an opportunity to learn more. For the Russellville high school students, the exploration of fluid mechanics in a lab setting is further expanded here, giving them the opportunity to explore more about the subject than they would in class.

Plan for Carrying Out Proposed Project/Activity/Event

Personnell and Expertise:

As mentioned, our chapter advisor was a member of a competitive swim team and made it to state. Likewise, the project lead was also a state swimmer and is currently a swim instructor. As a result, both of them have a unique perspective on optimizing fluid mechanics principles that serve as valuable tools to assist with explain concepts during the event and both of them have knowledge of water safety—essential for a water themed event. The project lead has been and will continue to coordinate with the Aquatic Center to ensure the event proceeds smoothly, following the event timeline below, and ensuring all proper people are contacted.

Members of the SPS leadership team are working together to compile the necessary information for planning the events as well. At this juncture, all five of our SPS chapter members and four of our uninducted chapter members

plan to assist in some way. The IEEE club has said they would likely help provide volunteers as well and can assist us prepare demonstrations. The Aquatic Center staff and life guards will also be assisting with overseeing the event and will be keeping the participants safe in the event of an emergency. In regard to ensuring all the marketing goes well, a record of contacts will be kept updated.

Marketing:

Marketing will involve a social media campaign and flyers our media manager will make and our chapter will distribute. Most crucial to ensuring the community comes will be spreading awareness on social media, which is why emphasis will be placed on that. When marketing, there are three main groups of contact:

- The College of STEM --- most likely email and in person meetings
 - Contact with professors in the Physics Labs and courses
 - Contact with professors in the Engineering department
 - Contact with the Engineering Club, IEEE, and potentially the Educators Rising Chapter
- Russellville High School --- most likely email, maybe class visitation during lunch
 - Email the AP Physics instructor and the Engineering teachers
 - Email the AP and GT coordinator
- City of Russellville --- most likely email and social media
 - Contact with the city zone representatives
 - Have members share on Facebook
 - Talk with local businesses and churches
 - Set up advertisement at the Aquatic Center for those who frequent it

Project/Activity/Event Timeline

11/14/25: Submit all request forms for SPS funding, ATU approval and funding, and Aquatic Center approval. Begin work on promotional materials.

12/31/25: Have the finalized details of the aquatic center reservation completed, including time and date of event and advertising we can host at the aquatic center.

1/16/26: Chapter Meeting assigning event tasks to specific volunteers and outlining the specific jobs to fulfill. Flyers and promotional materials should be completed by this week. Begin purchasing materials in the budget.

1/23/26: Reach out to members of the city council, downtown Russellville, and the High School to begin marketing campaign. Flyer postings and social media shares should have begun.

Sometime in February, arrange for a classroom visit to the high school.

Throughout late February and March, encourage ATU students and community members to begin planning and building their boats.

2/20/26: Check in with Demo Volunteers to ensure activities have been planned.

3/20/26: Conduct a volunteer briefing for those who will have more general tasks. Ensure they understand their roles and know the guidelines the Aquatic Center has given us to operate in. Ensure all materials have arrived and will set up properly.

4/4/26: Ramp up excitement as the event is 2 weeks away! Check in with people who are entering the competition, finalize all presentation materials at this point, ensure all volunteers are ready.

4/18/26: Host event!

Activity Evaluation Plan

During the event, we will be collecting various attendance metrics, such as how many people enter a boat to compete, how many visit our various displays, and some age demographic information on them. After the event, a survey will be sent out asking for feedback to the participants to see what was liked the most, what could be improved, and what they took away from the event. We also plan to check in with the Aquatic Center staff on their perspective about the success of the event, given their standing as our hosts. From these metrics, we can get an idea of what aspect people enjoyed the most and why they enjoyed it, so in a future event we can continue the trend.

Budget Justification

To have a location to host the event to begin with, we require \$300 to rent out a space at the Aquatic Center for 3 hours, including use of their lifeguards and life jackets. Due to the nature of the event, the Aquatic Center's facilities are the best suited: they are an indoor pool where the cold won't be an issue and they provide lifeguards to assist us in case of an emergency in the water. The Aquatic Center can also provide a limited number of life jackets for participants. To ensure there are enough life jackets, however, we also request some funds to purchase three. The benefit of our chapter owning these not only extends to the current event we'll host, but also to future events we might host involving large bodies of water. The Aquatic Center has time relay systems we will have access to use during the event as well.

To help with entry identification, we request some funds to purchase nametags. The nametags will help people identify each other without the pressure of asking for a name and allow participants to cheer for their vessel or for friends. We are able to get sharpies and writing supplies from ATU to write on the nametags. To keep score of the timers, we also have a marker board and expo markers ATU has provided.

During the event, we'd like to have some interesting displays, one of which involves buoyancy, for which a Galelio thermometer is purchased. The Galelio thermometer provides a unique item that most people haven't seen before, serving as an excellent conversation starter and a practical demonstration. Our other displays involve simple items that can be provided by ATU, such as a dropper and coins for surface tension, or paper airplanes to demonstrate and compare aerodynamics to hydrodynamics.

There is money allotted for the purchase of six medals, three for a first, second, and third place winner, and three for honorable mentions. Part of what makes a competition enjoyable is the desire to win, thus to help incentivize people to compete, we deem it fit to offer a prize. There are the traditional top three places, but we'd also like to give awards out for 'most creative design,' 'most determined competitor,' and an 'SPS choice' award to celebrate boats that—although not fast—were unique and reflected the hard work of the competitor.

Finally, we allot money to provide lunch for our volunteers, who will be working for approximately 3 hours during the event. Part of what allows an event to run smoothly is to have active and participating volunteers, so providing them lunch serves as an incentive to recruit volunteers and is a reward for their hard work.

For items that involve shipping, such as the medals, life jackets, and thermometer, we added on an additional predicted shipping cost necessary to purchase the item.