



# SIGMA PI SIGMA

The physics honor society

## Sigma Pi Sigma Chapter Project Award Proposal

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Project Proposal Title	What Physicists Can Do to Solve Emerging Issues in Our Environment?
Name of School	St. John's University, Jamaica, NY
Sigma Pi Sigma Chapter Number	303
Total Amount Requested	\$500.00
Project Leader	Ms. Rachel Tyo, Senior, Physics, SPS Member

### Abstract

The St. John's University chapter of Sigma Pi Sigma plans to host its 2017 induction ceremony by inviting local scientists, St. John's University physics alumni, current students and faculty, and local high school students to collaborate to solve emerging environmental issues involving physics. The ceremony will start with forming for 5-8 teams comprised of a mix of faculty, alumni, and students. After the teams become acquainted they will begin brainstorming approaches to build better-less costly solar ovens using the provided commonly available materials and a commercial solar oven as a starting point example. The team will assemble 1/8-scale ovens (so warming under a heat lamp can be used for testing and comparison) from the provided materials: plastic wrap, packing materials including foam and aluminum foil. The completed ovens will be tested in a friendly competition. Following the contest, new members will be honored and inducted to Sigma Pi Sigma. Another significant part of the ceremony is for invited local scientists to talk about the emerging issues in energy and environment, future employment prospects, and for our alumni to share how physics is applied in their careers. Particular emphasis is on the use of physical insight to address environmental and to help the disadvantaged. By inviting local high school students to the event, the ceremony will foster interaction between students, alumni, and local communities and inspire St. John's students as well as local high school students to pursue careers in science and engineering fields. The induction ceremony is a chance for our vibrant Sigma Pi Sigma students to inspire and welcome our high school students to choose to better the world through the application of physics. The award will be used to cover expenses for the solar oven contest building materials and prizes, souvenirs for alumni, and the ceremony dinner.

# Proposal Statement

## Overview of Proposed Project

The Society of Physics Students (SPS) Chapter at St. John's University, a primarily undergraduate institution, has become a vibrant student organization in the past six years as a result of the strong efforts by its members and help from the school's caring faculty. The Sigma Pi Sigma Chapter was also recently revived and has inducted a total of 56 fine physics undergraduates in the past six years. In addition to encouraging the study of physics and honoring those with outstanding academic achievements, our SPS and Sigma Pi Sigma chapters have also engaged in a variety of activities to assist St. John's students of various majors with their physics courses and to promote a science and engineering education among the local community.

Each semester our SPS chapter organizes a series of tutoring events and physics seminars: promoting student fellowship, fostering interaction between students and faculty, and encouraging undergraduate research. For example, on October 14th of 2015, St. John's SPS and Sigma Pi Sigma chapters co-organized the 1st Annual Physics Mid-term Prep Tutoring Session. We are also committed to promoting education of science and engineering among the general public by participating in various outreach activities and helping local inventors check the validity of their science.

Often local inventors call St. John's to tap St. John's Physics Professors for a trusted sounding board for their inventions and concepts. Our Professors generously spend their time listening and helping where possible. Interesting these contacts also confirm to St. John's that the public at large continues to be concerned about the energy, climate change, and the global resource supply.

Teaming with St. John's Science & Technology Entry Program (STEP), St. John's SPS chapter has been conducting a total of 12 physics workshops for the students in the STEP program since fall 2009. During these workshops, students from local middle and high schools gain hands-on experience by performing experiments adapted from our College Physics lab class. These workshops are well received by the high school students as indicated by their positive feedback form responses. Working with St. John's Academic Service Learning (ASL) program, St. John's SPS chapter also visits local high schools to give workshops to stimulate our younger generation's interest in science.



Members of St. John's SPS chapter culturing Algae for chlorophyll studies related to bio-mimicry based photovoltaic research.

With the generous support of the Sigma Pi Sigma national office and the St. John's University, St. John's Sigma Pi Sigma chapter has successfully hosted seven induction ceremonies from 2010 to 2016, honoring the outstanding achievements of our students and alumni. All events were well received by the students and their families and friends, invited guest speakers, and faculty and staff. Students were especially interested in networking with alumni and asked them for career advice.

As the public is becoming increasingly aware of environmental issues like climate change, at this year's Sigma Pi Sigma induction ceremony, we would like to bring our guest speaker, alumni, current students and faculty together to learn how physics can help the environment. As physics majors we have the unique power of understanding and we must use this power responsibly. To the St. John's SPS this means using the physics skills obtained in our education and careers to find innovative ways to help the poor and protect our planet.

This year plenary talks will focus on Physics in Medicine, Invention, and Patent Law. The point is that Physics degrees not only fuel meaningful careers but also provide an essential vehicle for technological revolution. We will also invite our physics alumni whose careers are related to energy and environment to the ceremony and ask them to share their experiences of applying the physics learned at St. John's to solve various environmental and socially important issues.

The Sigma Pi Sigma induction ceremony and the dinner banquet following the ceremony will be held in the evening of April 6th, 2017. About 15-20 physics alumni and their family members, 15-20 Sigma Pi Sigma members including new inductees and their guests, and 10-15 students and faculty members from all science departments of the St. John's University are expected to attend the event. In addition, we will invite 7-8 local high school students plus their parents to the ceremony. A total of 60 attendees are thus expected at the ceremony.

The event will start with a solar oven building-contest where teams will compete to build their ovens and apply principals of optics and heat flow to optimized the amount of sunlight directed into the oven and take measures to mitigate thermal losses all the while using low cost materials such as cardboard, aluminum foil and refuse Styrofoam packing materials. We expect the contest should bring a lot of fun to the event, especially with the participation of alumni and high school kids. The formal ceremony will be opened by the Chair of the Physics Department, followed by induction of the new Sigma Pi Sigma members. The main part of the ceremony is for our guest speaker and alumni to share with the audience how they have used their physics knowledge to help the environment.

We expect the event will promote students' interest in physics, provide opportunities for students and faculty, alumni, and the local communities to interact with each other, and inspire the younger generation to become tomorrow's leaders in science and engineering fields.

### **How Proposed Project Meets the Purpose of the Award**

- Since 15-20 alumni and their family members are expected to attend the event and interact with our students and local high school students, the event will build community among alumni, new and current Sigma Pi Sigma members, and local high school students.
- We expect to induct 7-8 new members into Sigma Pi Sigma, bringing the total number of inductees at St. John's University to more than 60.
- By inviting local high school students and their parents to our Sigma Pi Sigma induction ceremony, it will raise the awareness of Sigma Pi Sigma in the local community and promote the study of science among the younger generation.

- Our SPS chapter has been named one of the outstanding chapters by the SPS national office twice in the past three years. We will celebrate these achievements at the event and also make our SPS chapter more visible to the community.

### Plan for Carrying Out Proposed Project

- Personnel planning and organizing the event:  
 SPS President: Ms. Rachel Tyo  
 SPS Vice-President: Mr. Mitchell Sofletea  
 SPS Secretary: Ms. Seychelle Khan  
 SPS Treasurer: Mr. Christopher Paider  
 SPS Public: Ms. Emma Montgomery  
 The teams will be assisted by Ms. Mary Ann Frohnhoefer, secretary of the Department of Physics and Dr. Charles M. Fortmann, faculty advisor of SPS.
- Marketing  
 Invitation letters will be sent to alumni and local high school students. Emails will be sent to current students and faculty of St. John’s University to invite them to the event. Event flyers will be made and posted on the St. John’s University Website and on bulletin boards at various places on campus.
- Sigma Pi Sigma member participation  
 We expect to induct about 7-8 new members into Sigma Pi Sigma at the ceremony. About five to six current Sigma Pi Sigma members are also expected to attend the event. In addition, 10-15 students and faculty members from all science departments of the St. John’s University are expected to attend the event.

### Project Timeline

April 6, 2017	St. John’s University 2017 Sigma Pi Sigma Induction Ceremony
April 1, 2017	Prizes for best low cost solar oven
March 31, 2017	Deadline for alumni, high school students and guests, current students and faculty to confirm attendance
March 15, 2017	Materials for the solar oven building contest prepared
March 10, 2017	Invitations sent out to current students and faculty
March 10, 2017	New inductees’ information sent to the Sigma Pi Sigma national office and reception items ordered
March 1, 2017	Deadline for inductees to reply to invitation

February 15, 2017	Invitations sent out to new inductees
February 1-15, 2017	New inductees selected by the committee
January-February, 2017	Invitations sent out to alumni and local high school students

## Project Evaluation Plan

The project will be evaluated in the following aspects. The number of participants will be recorded by asking attendees to sign in at the event and this number will be compared with our expected number of 65 participants. A post-event survey will be conducted to get feedback from the participants. Suggestions and feedback will also be sought by speaking with current students and faculty directly after the event.

## Budget Justification

We will use the award to cover expenses including: materials for solar oven building contest such as aluminum foil, plastic wrap, and duct tape as well as for prizes and motivational gifts for our High School students, Guests, and outstanding SPS members. The remainder cost of the dinner banquet and other necessary expenses on items such as invitations and decorations will be covered by solicited contributions from the St. John's University.

The solar oven-building contest will bring a lot of fun to the event. It will require students to apply physics knowledge in conjunction with teamwork to construct a functioning unit that will be evaluated based on the ability to heat 50 cc of water in 30 minutes as well as the creativity of the design. We expect participants will be excited about this contest especially given the participation of alumni and high school students.

The dinner banquet will provide all participants of the event opportunities to network with each other and bring our alumni, students and faculty, and local communities closer, spark friendly and productive communications, and promote fellowship among them. This event is designed to demonstrate that the Physics Community is a: welcoming, supportive, and diverse group of caring people striving to better the world through creative scientific endeavor. These friendly conversations will inspire our students and encourage local high school students to pursue careers in science and engineering and become tomorrow's leaders in their respective fields!