

Report on Marsh White Grant
Creating an Ithaca College Society of Physics Students Physics Circus
Ithaca College Chapter of SPS
29-May-2006

Abstract: *The Ithaca College Chapter of the Society of Physics Students proposes the creation of a “Physics Circus” that will regularly visit local middle schools in the Fingerlakes Region. This will benefit not only the middle school students by teaching them physics in a hands-on manner, but will enable our SPS members to get valuable experience teaching and interacting with middle school students. Depending upon the audience there will either be numerous stations that small groups of people rotate between, or one stage that all the demonstrations are done on with one audience. The Physics Circus will cover topics in mechanics, optics, electricity and magnetism, fluid dynamics, and thermodynamics. All of these demonstrations will be in ready to go transportable crates. We will also develop instructional materials to make it easy for future SPS members to use the Circus materials.*

We requested \$280 to fund part of our efforts to build a physics circus that SPS members will use during outreach to local middle schools. The money was requested to purchase items for a Bernoulli Ball experiment (an electric leaf blower, beach ball, and extension cord), and a Conservation of Angular Momentum experiment (pair of dumbbells and a stool). Along with receiving a Marsh White award we applied for and received “matching” funding for our physics circus from the New York State Section of the American Physical Society (\$980.60). We delayed purchase of the items identified in our Marsh White proposal until we received funding notification from the NYSS-APS so that we could make a single purchase. Unfortunately, the NYSS-APS funds did not arrive in time for us to make a purchase this fiscal year. Our campus cuts off purchasing by student clubs during the last week of classes, which is 6 weeks before the actual start of the new fiscal year. Fortunately the Marsh White funds and the NYSS-APS funds roll over to next year’s budget and one of our first agenda items is to make our physics circus purchases.

While waiting for funding decisions several SPS students assisted Ithaca College physics professor Luke Keller in conducting outreach activities at a local middle school. This was excellent training for conducting such outreach. Additionally, one of our SPS members (Lia Stelljes) who will be heading the SPS physics circus team is doing a 10-week summer internship at the Ithaca College Sciencenter with funding from the Ithaca College physics department. Her internship will focus on constructing hands-on, active-learning physics displays for the Sciencenter. These experiences will lead to a first rate outreach program in the Fall 2006 (and on).

With our current funding we have the resources to create a circus containing the following experiments:

Liquid Nitrogen Banana hammer: Describes properties of different states of matter, by demonstrating the rigidity of solids versus liquids. (<http://van.hep.uiuc.edu/>)

Conservation of Angular Momentum: This demonstration will consist of someone getting spun around on a stool holding 2 dumbbells with his/her arms fully extended. By moving the weights toward the axis of rotation the person will spin faster thus showing conservation of angular momentum

Energy and Light: Will consist of a number of demonstrations using prisms, polarizes, lenses and lasers to demonstrate the behavior of light and light's relationship with energy. Topics will cover how frequency determines the diffraction of light, how lenses diffract light, and different components of light.

Bernoulli Ball: The demonstrator will place a beach ball in a vertical air stream (created by an electrical leaf blower), once stabilized the air stream is slowly moved towards the horizontal. Bernoulli's principle will be used to explain the behavior of the floating ball.

Van de Graaff Generator Experiments: The type of demonstration will depend mostly on the audience but the general goal will be to show the behavior of electricity and charge distribution.