

## **BUDGET EXPLANATION PAGE**

### **A,B. PERSONNEL**

During the academic year, the PI's time is nominally 50% for teaching and other academic duties and 50% for research (at no cost to grant). The summer is devoted full time to research. The PI's summer salary will be divided between this grant and other projects. The PI will be responsible for the overall performance and coordination of the project. He will supervise the graduate students and interact closely with the high school teachers and students who will play an active role. He will also continue to be the primary contact with the Sherman family. In the preliminary work now in progress, the PI has taken the lead role in electronics design and development, particularly in learning and applying the methods for programming and interfacing microcontroller integrated circuits and associated electronics. He will continue to play an active role in this and associated NeatTools software development and interfacing. The PI will also tie this effort with his other science education activities, including a) the Science for the 21<sup>st</sup> Century course (PHY105/106; [physics.syr.edu/courses/PHY105](http://physics.syr.edu/courses/PHY105) or .../PHY106) which he co-created with Prof. Marvin Goldberg at Syracuse University in 1992/93, and b) two current NSF-supported science education grants (see Current and Pending Support).

The co-PI, Geoffrey Fox, will assist in the planning and execution of the project bringing to bear, in particular, his expertise in distributed computing and World Wide Web technologies, exemplified by the TANGO Web-based collaboratory system (<http://trurl.npac.syr.edu/tango/index.html>). This can be used for collaboration at a distance and will facilitate our interactions with the high school teachers.

David Warner, who is responsible for bring us this innovative approach for enabling technologies, will play a continuing part-time role in this project. After his Nason Fellowship ends, he expects to maintain a significant presence in Syracuse, while having several other bases from which to pursue his work for the disabled as well as for telemedicine ("distributed medical intelligence"). He intends to maintain the "Center for Really Neat Research" (<http://www.pulsar.org>) at Syracuse for many years to come. He has been actively involved in our work with Eyal Sherman from its inception, and is committed to seeing it reach a high level of success. He is also committed to using our interface technologies for the promotion of science education in general.

The graduate students will assist in the continual development of application software and interface devices for the project as well as the design of robotic and other control systems for science education. This will be done in coordination and cooperation with the high school teachers and students from Nottingham High School, and some other local schools.

A 4% increase has been applied to personnel and other costs for the second and third years.

### **D. EQUIPMENT**

The equipment budget will enable the purchase of personal computers (approx. \$2,500 each, including multimedia options) for use by Eyal and other disabled students in science classes at

William Nottingham High School in Syracuse. The school does not currently have any Pentium level machines in science classes. Equipment in the second and third years will include replacement of computers used in the development work on the project as well as the machine at the Sherman home, which was purchased and donated by NPAC in 1996.

#### E. TRAVEL

The domestic travel amount will support travel of the senior investigators and students to conferences where we will present and exhibit our systems and results. This will also support travel of high school teachers to appropriate conferences, such as that of the American Association of Physics Teachers.

#### G. Other Direct Costs

##### 1. Materials and Supplies

The materials and supplies include software, computer peripherals and media, electronics parts, sensors, transducers, and mounting hardware components.

##### 2. Publication Costs/Page Charges

This will cover duplicating, page charges, and reprints of journal publications, as well as brochures.

##### 3. Consultant Services

The high school teachers will be compensated on a consulting basis for their after-hours efforts during the academic year and summer. In addition, talented high school students (including Eyal Sherman) will be rewarded for their special efforts on the project, which is designed to have national impact. Given the varied demands on the time schedule of these students, we believe that tangible compensation will be a wise investment to maintain their commitment and attention to the project during the school year and the summer recess.

##### 6. Other

Tuition charges have been budgeted for one of the two graduate students. Syracuse University will cover the tuition for the other student as a cost sharing contribution. The amount entered for the first year is based on 24 credit hours at \$529 per hour. The amount of \$3,000 has been budgeted for work in the Physics machine shop based on a subsidized hourly rate of \$25. This will cover mounting systems for sensors and transducers, as well as machining of electronics enclosures, and custom parts as needed for the high school science experiments.