

The Newsletter of the Shodor Education Foundation, Inc.



LOOK INSIDE:

Great Developments

Shodor Interns Emeriti:
Where are they now?

SUCCEED Spring and
Summer Workshops
& Mentor Center
Internships

Preparation for the
Future

NCCU-Shodor
collaboration wins
digital library grant

Activities for Kids

A New Year and a New Shodor

By Robert M. Panoff, Ph.D., President and Executive Director

With this issue of *Interactions* we begin a new year, a new decade, and a new phase for Shodor.

All through this past year, and continuing even now, we have been celebrating "the tenth anniversary of everything" in the history of Shodor. For ten years we have been working locally and nationally in the service of improving math and science education. More than 1000 area students have participated in our workshops and classes, and in 2004 we welcomed our largest class of high school and college interns.

Every month students and teachers access our web pages more than 2,000,000 times (not hits, *pages!*). Hundreds of college faculty and pre-

college teachers benefit from our workshops funded by the National Science Foundation. In recognition of the national leadership role we have in computational science education, NSF awarded us the largest Pathway grant to date to enhance our Computational Science Education Reference Desk as a portal for the National Science Digital Library (<http://www.nsdlib.org>).

More and more, we see young women and men catching the excitement of science, mathematics, and education in a technology-rich environment. And in this excitement, we realize we have reached a critical phase: we are too small to be big, and we are too big to be small. Simply put, we have outgrown our present space.

For the last eight years, we have squeezed all our staff and interns into spartan offices on Broad Street. With more and more students wanting to participate in the workshops and internships of our Mentor Center, we have reached the breaking point where I can no longer assure parents and students that our space is safe and appropriate. After a careful review, it is clear that our future service to math and science education requires significant resources to expand our current facility, or to find and move to a new location and to finance any modifications to that new space.

Rather than cut back or limit student participation, in December I sent out a

continued on page 2

Great Developments

Shodor would like to welcome new staff member Simon Karpen. Simon, a former intern and graduate of Rensselaer Polytechnic Institute and the North Carolina School of Science and Math, returns to us from the University of New Hampshire and will be working on System and Network Administration as well as System Support for the Computational Science Education Reference Desk.

The Shodor Education Foundation and North Carolina Central University announced a \$2.8 million grant from the National Science Foundation to open a new Pathway to the National Science Digital Library, NSF's online library of resources for science, technology, engineering, and mathematics (STEM) education. For more information see the article on page 4.

The Mentor Center @ Shodor has been awarded a \$5,000 grant from the Rambus Foundation at Community Foundation Silicon Valley. This grant will expand the opportunities available for high school students to gain expertise in the fields of math, science, technology, and engineering through mentor-guided internships at Shodor.

Shodor has expanded its involvement with the Emerson Waldorf School in Chapel Hill. Shodor mathematicians Bethany Hudnutt and Matt Lathrop have been serving as math tutors, and Shodor scientist Garrett Love is teaching two units during the month of January, one on Computers and the Internet and another on Environmental Science Modeling.

Shodor staff scientist Garrett Love has been working with the Contemporary Science Center in Raleigh (www.contemporarysciencecenter.org) as a teacher and curriculum developer. During the 2004-05 school year, Dr. Love taught a regular day-long laboratory unit on Cystic Fibrosis that includes a dose-response curve assay and computer-aided numerical analysis.

Shodor Staff

| | |
|--|--|
| President & Director Robert M. Panoff, PhD | Computing Science Mentor Patricia Jacobs, MS |
| Mathematics Educator Bethany Snyder Hudnutt | Mathematics Educator Matt Lathrop |
| Engineering Educator Garrett Love, PhD | NCSI Program Assistant David Hillman |
| Financial Manager Joyce South | System Administrator Simon Karpen |
| Computational Science Educator Kent Robertson | Visiting Scientist Valerie DeBellis, PhD |
| Computational Scientist Matt Desvoigne, MS | International Staff Cornelia Seiffert, MS Diana Tanase, MS |

Interactions is a regular publication of the Shodor Education Foundation, Inc. To be added (or removed) from our mailing list call (919) 286-1911 or email moreinfo@shodor.org

Shodor Interns Emeriti:

By Renee Gerber, Executive Assistant for Imagine Schools and former Shodor Intern

Previous interns at Shodor will often contact us to update us on where their career has taken them so far and how Shodor has been a part of that success. The following article is one such example from former intern, Renee Gerber

Where are they now?

Dear Shodor:

As I am now beginning my first full-time job since graduating from the University of Chicago this past June, taking a break from classes for a while until I go back to law school, I wanted to take this opportunity to write about Shodor and everything it has done for me. It will also give me the opportunity to present myself to younger (or future) interns as an example of why working at Shodor is so great. To put it simply, Shodor was my first real job, and I am convinced it has gotten me pretty much every other job offer I have ever had.

When I first moved to college I needed to find a job in the area. I found out about a position where you were placed in schools and consulted teachers about how to integrate computers and technology into the classroom. After speaking with the Neighborhood Schools Program about the position, I was told that while they often hired new students as classroom tutors, or even IT people for school networks, the only people who were Project Assistants were graduate students. But I fought for the position, explaining that I had helped in workshops for educators that introduced them to the internet and specialized programs for their classes. I talked about SUCCEED and Interactivate, and how computational programs could

study population dynamics. I talked about the STELLA bubonic plague model, and how there were always students just aching to make that model because their end of class projects would include pictures of the plague.

And so I became the first freshman to be hired in the position as Project Assistant because of my experience at Shodor.

Similarly, when I moved to Washington DC I did not have a job yet. So I spent the summer working at a day camp and applying for jobs. I applied for teaching positions and social science research positions, PR positions, and paralegal work. Every place I interviewed asked me about Shodor. It's certainly not the average job for someone just out of school to have—I have worked on projects in chemistry, physics, and even Braille, apart from teaching SUCCEED workshops. Every place also asked me what my favorite working environment has been, and then I got to talk about how Shodor let me do lots of things I did not have experience in, trusting me to learn. I got to talk about how I always had multiple projects at Shodor, like teaching in the morning, and working on rewriting a curriculum or making



Renee assists students during a 2002 summer workshop.

images for a different class in the afternoon.

At one interview, I was applying for a job to teach technology classes at a K-8 school. They didn't have a curriculum or any idea of what they wanted, but they knew they wanted the kids to have those classes. I immediately launched into the ideas I had used in my SUCCEED classes. An hour later I was offered the job.

Eventually, I heard about a job at a school management company called Imagine Schools. The company was young and the position was given a very loose description of Assistant to the Legal and Financial Departments. When I came in for a first interview, I was told that a lot of the job would be figuring out how to do things together, and setting a protocol. No problem, I replied. You see, I've worked at Shodor.

I got the job and though my official title is still a vague "Executive Assistant",

continued on page 4

New Shodor

continued from page 1

request for help to those on our mailing list. The response has been encouraging, enough to help us begin the planning stages. The three things I asked for were:

Time and Expertise: I told you we needed help finding or designing a new location, to grow our board membership, and to develop a longer-range strategic plan. Many of you have stepped forward and offered to help with your time. We will be contacting you to follow up. In the meantime, we could still use more volunteers.

Money: For ten years all of our

operating costs including rent have been paid for by our grants and contracts. But the cost of improving our current space, or a move to a new facility can't be charged to these funds. A preliminary study found that we need close to \$250,000 in improvements and/or up fit and moving costs. So far more than \$15,000 has been contributed by parents and participants in large and small amounts, with another \$10,000 pledged by current board members. We are grateful for all of this support, and hope others can help. We are beginning a more formal process of raising funds.

Contacts: We asked if you knew others, either individuals or organizations, who could understand

our mission and who would want to contribute their time, expertise, or money. Several of you have pointed us to grant sources, or told us about your own company's grant programs. This is precisely the help we need to move ahead.

Over the next year, we will develop a long-range plan for Shodor's fiscal health and stability to coincide with improving our current facility, or moving to a new space. My goal remains the same: a safe and appropriate learning space for as many students and teachers who want to participate in the good work of Shodor. Thank you in advance for all of your help and support as we make this shared dream come true.

SUCCEED

Register for 2 or more workshops and we will discount the fee \$50 per class.

Spring/Summer 2005 Calendar:

| Event | Dates | Times | Grade Levels | Workshop Fee* |
|---|-------------------------------------|----------|--------------|---------------|
| Saturday Explorations in Science and Math | March 5, 12, 19, April 2, 9, and 16 | 9am-Noon | 6-8 | \$250 |
| Medicine and the Biosciences | June 13-17 | 9am-Noon | Rising 8-9 | \$250 |
| Forensic Science, Session A | June 13-17 | 1pm-4pm | Rising 8-9 | \$250 |
| Internet Science Explorations | June 20-24 | 9am-Noon | Rising 6-8 | \$250 |
| Math Explorations | June 20-24 | 1pm-4pm | Rising 6-8 | \$250 |
| Modeling Your World | June 27-July 1 | 9am-Noon | Rising 6-8 | \$250 |
| Engineers in Training, Session A | June 27-July 1 | 1pm-4pm | Rising 6-8 | \$250 |
| Shodor Scholars Program | July 11-22 | 9am-4pm | Rising 10-11 | \$200 |
| Engineers in Training, Session B | August 1-5 | 9am-Noon | Rising 6-8 | \$250 |
| Math Connections | August 1-5 | 1pm-4pm | Rising 8-9 | \$250 |
| Environmental Science | August 8-12 | 9am-Noon | Rising 8-9 | \$250 |
| Forensic Science, Session B | August 8-12 | 1pm-4pm | Rising 8-9 | \$250 |

*Need-based financial assistance is available; no qualified student will be turned away for financial reasons.

Preparation for the Future

By Amanda Amoateng, Freshmen at Xavier University of Louisiana and a graduate of Hillside High School in Durham

I am proud to admit that for the past year, Shodor has been the source of a welcoming experience quite unlike any other. As a new intern in 2003, I entered the work scene without much computer experience, knowing very little about various computer languages and modeling tools. Yet as the weeks progressed, so did I. I developed as a web programmer and a modeling specialist. After incorporating the daunting new task of teaching to my list of responsibilities this past summer, I have realized that Shodor means more to me than merely a place to work. Over the short time I have been here I have seen it mold me and other fellow interns intellectually and socially.

Before receiving an internship at Shodor, I had informed them of my interest in biology, chemistry, physics, and my desire to pursue a career in the medical field. This is perhaps the reason why I was so fortunate to obtain a position at Shodor. It gave me the opportunity to work on developing the biomedical sciences website. The experience working in this area gave me the opportunity to further explore concepts briefly discussed at school. During my first summer at Shodor I was given the opportunity to research various areas of epidemiology, including a somewhat under-

researched disease known as Sickle Cell, which I knew little about before working at Shodor. I was able to learn more about its symptoms, genetic developments, and possible treatments through website development and implementing modeling tools, things I was never exposed to and could not do at school. This work provided me with a different perspective on biology, particularly genetics, that I truly benefited from seeing. I look back at that now with appreciation, especially since I'm now a Biology-Premed major at Xavier University of Louisiana.

I also enjoyed the many personal interactions I have had at Shodor. Perhaps what makes Shodor unique is the fact that its staff encourages interns like myself to collaborate with both staff and interns. By assigning us to various collaborative projects we are not only able to get the task done, but we also learn by communicating with one another. Success depending on supporting each other as one unit, or better put, a family. Teaching is another aspect I will always cherish. Teaching a workshop this summer gave me the opportunity to plan out a

lesson and really test my presentation skills.

As you can see, Shodor has been an experience worth cherishing. Working here has made me a better student. I have not only grown as a web designer and programmer, but as a person, too. As an intern, I received the opportunity to further explore my interests in science in the highly motivated but low pressure environment that is Shodor. My experiences here

motivated me more to pursue my interest in medicine.

If you would like more information on the Mentor Center @ Shodor, please contact Matt Lathrop by phone at (919) 286-1911 or by email at moreinfo@shodor.org.

Amanda works alongside fellow students in the Scholars Program.



SUCCEED Workshops (for rising 6th – 11th graders)

SUCCEED workshops are the first phase of Shodor's Student Enrichment programs. Here, rising 6th – 11th graders receive an introduction to computational science, using computers to model different mathematical and scientific phenomena. Over the course of the workshop students will explore topics like engineering, forensic science, mathematics, and environmental science, among others, and see how computer modeling can be used in these areas. Practicing scientists and mathematicians, along with Mentor Center interns, will instruct students and guide them as they explore and discover. For more information about SUCCEED workshops, please visit www.shodor.org/succeed, or contact Matt Lathrop at (919) 286-1911.

Mentor Center Internships (for high school and college students)

Internships with Shodor allow high school and college students to continue to expand their knowledge of computational science in different fields. Each student is paired with a Shodor staff member or a scientist from a participating organization, who serves as a mentor and guides the intern as they assist in the development of models, curriculum materials, web page development, and other tasks associated with ongoing, grant-funded projects at Shodor. Having been exposed to cutting-edge tools for exploring math and science, interns leave Shodor better prepared to step into computationally intensive scientific research fields.

NCCU-Shodor collaboration wins digital library grant

By Michael Petrocelli, mpetrocelli@herald-sun.com

Reprinted with permission from the Durham Herald-Sun, Tuesday, October 18, 2004

For more information visit the CSERD home page at cserd.nsdli.org.

DURHAM — A collaboration between a Durham-based nonprofit and N.C. Central University is slated to receive nearly \$3 million from the federal government to help build a Web-based math and science library.

The Shodor Education Foundation, which promotes technological methods of teaching math and science, has been named a "pathway" into the National Science Digital Library, designed as a reliable online source of facts and tools for teachers and researchers.

Shodor, which is partnering with NCCU on the project, will receive \$2.8 million over four years from the National Science Foundation,

which runs the library. During the first year of the grant, about \$80,000 will go to NCCU, according to Shodor Executive Director Robert Panoff.

The digital library already links to some of Shodor's teaching tools, which include interactive models showing how functions translate onto graphs and how math can be used to predict changes in ecosystems. But whereas Shodor was just a link from the library before, now it and its university partners will be responsible for assembling information and verifying its accuracy.

Trustworthiness is what separates the digital library from the World Wide Web as a whole, Panoff said.

Typing a basic science fact like "mass of the earth" into a search engine like Google yields several different answers with no guidelines to point out which is most reliable.

"There's no way to know," he said. In contrast, Panoff said, those

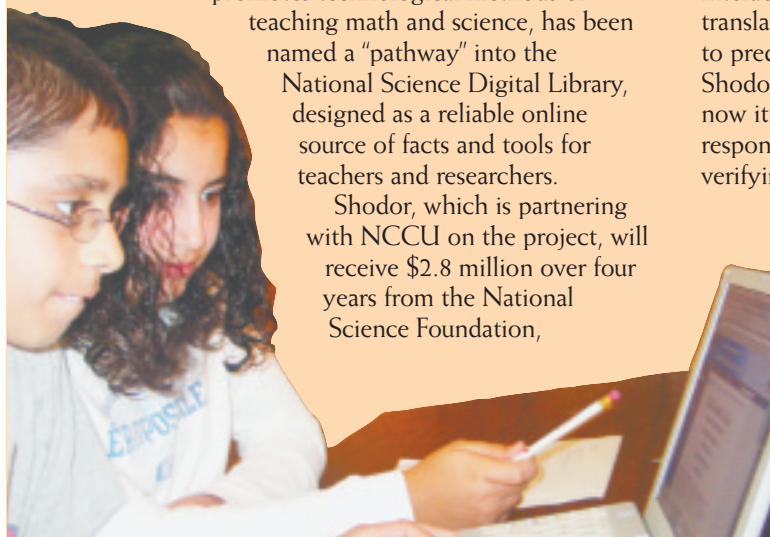
searching the digital library can be confident that the answers they find have been checked by real scientists.

The NSF's digital library was launched in 2002 and contains contributions from more than 150 sites.

NCCU Provost Lucy Reuben said working with Shodor on the project would help the university as it plans to add a new degree program in computational science, a field that focuses on the use of computers to solve complex scientific problems. The proposed bachelor's degree would be the UNC system's first in the field.

Shodor's work on the digital library will focus heavily on computation science and will rely partly on the help of NCCU faculty, making it a natural fit with the planned degree program, Panoff said.

"This grant will assist us in ensuring that NCCU grads are leading contenders in the 21st-century economy," Reuben said.



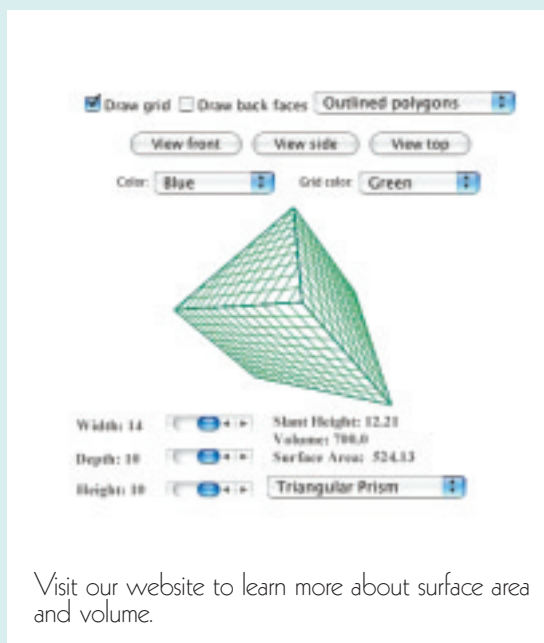
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Science & Math Explorations for Students

Activities for Kids

How does changing the height, width, or depth of a box change the overall volume? The overall surface area? If you're not sure, then open up your nearest web browser and go to Project Interactivate's Surface Area and Volume activity to find out!

This activity allows you to experiment with how changing the height, width, or depth of a rectangular or triangular prism effects both the volume and surface area of the prism. It allows you to rotate these three dimensional objects to help visualize these prisms and their subsequent measurements and the effects of changing their measurements.



Visit our website to learn more about surface area and volume.

Are there any patterns or relationships you can find between the ratios of width, depth, height, volume, and or surface area? Experiment and see at: http://www.shodor.org/interactivate/activities/sa_volume/

Interns Emeriti

continued from page 2

I'm starting to understand all the different things for which I am responsible. I assist the corporate counsel by doing both administrative and paralegal work. I do the bookkeeping for a new subsidiary company that buys and sells property for the schools to use. I have become the person in charge of corporate insurance, as well as managing the policies at over thirty schools nationwide. And, I'm the secondary IT person at the corporate offices. Finally, whenever there's something else urgent to do, like file charter applications, I help assemble and proofread those.

When I tell my friends what I do, they say it sounds intimidating and a bit daunting. But I say, as I said at every job interview, "Oh, I can do it. You see, Shodor prepared me." So thank you Shodor!

— Renee