



A newsletter for students, parents, educators, and friends

Spring 2002



What's Inside? New Developments!

New board room with plasma screen and new staff! Read about our improvements.

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Cool Computational Science Activity:

See the back of this newsletter for a fun online predator/prey activity!

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Summer SUCCEED Workshops:

Middle School Explorations in Science and Mathematics schedule.

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***Sign up now! See mail-in application inside.**

This publication is available in Braille and on the World Wide Web at:
www.shodor.org/newsletter

NCSI: The Newest Initiative

by Kirstin Riesbeck, Former RA & New Shodor Staff Member

On December 18, 2001, the National Science Foundation announced a \$2.7M grant to fund The National Computational Science Institute (NCSI). NCSI is Shodor's newest initiative and has been given the charge to integrate computational science into undergraduate curriculum across the United States. NCSI will introduce undergraduate faculty at small-to-medium sized universities, community colleges, and minority serving institutions to using hands-on computational science, numerical models, and data visualization tools across the curriculum. NCSI will offer a national set of in-person, video-conferenced, and web-accessible workshops, seminars, and support activities. NCSI will proceed along three synergistic but distinct routes that can be modeled as PULL, PUSH, and PERMEATE.

Regionally distributed workshops will PULL faculty within a reasonable travel distance for a week of intense interdisciplinary training, collaboration, and curriculum development in computational science. NCSI

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Computational Science Gets Down and Dirty!

by Bob Gotwals, Computational Science Educator

Shodor was recently awarded \$7,500 by the Fox Family Foundation, a local Durham philanthropic group, for the "Farmer Mark's Field" project. This project, written on behalf of and in collaboration with Forest View Elementary School (Durham Public Schools), looks to serve as a "proof of concept" for Forest View's "Circle of Science". The Circle of Science is a series of outdoor science activities for elementary students, placed in a circle around the school. Each of the stations will focus on some aspect of science, such as mechanics, the water cycle, the food chain, and meteorology.

Farmer Mark's field is a family farm located directly north of the school, and is actively worked by Mark Waller and his father. The farm has long been a resource for Forest View students, but this project will under-

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staff and participants will proactively PUSH computational science and computational science education onto the agendas of professional and discipline-specific societies by offering workshops, conducting tutorials, presenting papers and posters, and serving on program committees. NCSI will PERMEATE on-going and proposed undergraduate curriculum efforts with computational science content. NCSI will develop and provide interdisciplinary and discipline specific web-accessible courses for faculty enhancement and resources for interactive exploration including interactive curricula, problem-based modeling modules, tools, and tutorials. Shodor's award-winning Computational Science Education Reference Desk will serve as the organizing structure for dissemination of NCSI materials. NCSI participants will then assist others on their own campuses and at neighboring institutions to introduce computational science in their own classes.

The announcement of NCSI was well received, and NCSI was given wonderful support and encouragement from all those in attendance. Dan Reed, Director of NCSA/Alliance called NCSI an "exemplary project."

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286 - 1911 or email newsletter@shodor.org

Andrew Bernat, NSF Program Director in the Division of Undergraduate Education, said that he looks forward enthusiastically to the results of our partnership. Robyn Render, Vice President for Information Resources and Chief Information Officer of the 16-campus University of North Carolina, said that she expects great work from NCSI. J. B. Buxton, Education Advisor to Governor Mike Easley of North Carolina, in recognizing the significant number of graduates from the North Carolina School of Science and Mathematics working with Shodor, indicated that

INTERN OPPORTUNITIES

The following volunteer and paid opportunities are available to qualified high school and college students:

Newsletter Apprentices - help write, edit and layout stories for this newsletter

HTML, Java & Perl Programmers - make interactive web-based science and math activities

MacOs/Linux/NT - assist with regular system maintenance and backup procedures

Graphic Designers - Design dynamic graphics for the Web

For more information: contact Bob Panoff at 286 - 1911 or rpanoff@shodor.org

Exciting Developments!

We are proud to note several recent developments at Shodor:

GROWTH: With help from generous donations by our supporters, Shodor has modified part of the new office space upstairs into a state-of-the-art conference room complete with a plasma screen for presentations. Additionally, we would like to officially welcome Mrs. Joyce South back to the staff of Shodor. She will be in charge of Shodor administration.

AWARDS/PUBLICATIONS/ACHIEVEMENTS: Shodor was awarded a Local **ESGR (Employer Support of the Guard and Reserve) Award**. Out of 248 nominations, Shodor was one of 26 awardees in NC to receive this recognition. For more information about ESGR visit their site at: <http://www.ESGR.org>. We were also awarded a DIVERT recycling award from the City of Durham for the 2nd time in a row (http://www.ci.durham.nc.us/departments/solid/wr_business_awards.asp).

Bethany Hudnutt, Math Education Specialist, published an article about Shodor's various projects for *Meridian Magazine*. You can view this article at: <http://www.ncsu.edu/meridian/> (under current issue).

Garrett Love, Engineering Educator, published an article in *The International Journal for Numerical Methods in Engineering*.

Alton Patrick, Shodor Software Engineer, had a paper - based on work he did in college - published in the journal *Optimization and Engineering*.

Cornelia Simons, Bioscience Education Specialist, has just had a paper, based on her Master's thesis, accepted for publication at *The Journal of Human Evolution*.

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NCSI was an opportunity to lead and to serve.

Preparation for this summer and fall is moving ahead. Dates for all of the summer 2002 workshops and the application are available on the NCSI web site at <http://www.computationalscience.net>. You can use this web site to find out the most recent information about the program at any time.

In addition, NCSI has formed several important partnerships. One of these partnerships is with the Advanced Networking with Minority Serving Institutions program at the National Center for Supercomput-

Computational Science gets Down and Dirty!

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take a detailed scientific investigation of the various aspects of the field. The emphasis is on soil erosion, stormwater runoff, and best agricultural practices. The program, described below, is currently being designed and pilot-tested with 15 fifth-graders who meet once a week for the "Farmer Mark's Field Club", one of several fifth-grade enrichment clubs offered by the school. The 15 students are currently working in three teams; the "soil scientists"; the "scale model engineers"; and the "computational scientists".

This project will use three "models". The first "model" is the field itself. Working with a Forest View science teacher, the "soil scientists" will conduct a wide variety of soil science studies, looking to understand soil composition, its ability to absorb water, and ideal soils for planting of various crops. These junior scientists will make numerous trips to the field, and will learn how to study soils using many different techniques and tools.

The second "model" is a scale model. The "scale model engineers" team, led by stormwater engineer John Schrum of the John R. McAdams Company, Inc., are learning how to use topographic maps and other engineering skills to create a scale replica of the field. This scale replica will be located in the Circle, outside the school building. This scale model will serve as a visual organizer for future students and their teachers, providing them with a safe and effective way to "see" the field. In addition, the engineering team will use a stream table to conduct experiments to help them understand water runoff, soil

ing Applications at the University of Illinois. We are also working with Sigma Xi, an international scientific research society, to offer a series of workshops for their chapters across the U.S. The Consortium for Computing in Small Colleges has asked that we provide workshops on computational science at their regional conferences over the next year, and we have already scheduled three of these to date.

The National Computational Science Institute is well on its way to implementing the vision of making training in computer modeling, scientific visualization, data mining, and informatics accessible to undergraduate faculty across the country.

erosion, appropriate use of fertilizers, and other farming issues.

The third "model" will be a computational representation of the field, using a variety of advanced computing tools. Led by Bob Gotwals (Shodor computational science educator and project director), the "computational scientists" team will use several computer models to investigate soil erosion, annual rainfalls, sedimentation yields, and the effect of different types of crops and farming practices (plow types and methods, etc.) on soil. The primary tool to be used will be the Water Erosion Prediction Program (WEPP), an online model created by the US Department of Agriculture and Purdue University. Students will also use modeling tools such as Excel and STELLA to build smaller models and to analyze data generated by the larger model.

In addition to the design and pilot-testing, a local Boy Scout is working with Shodor and Forest View to physically construct the outdoor "Circle of Science" facility. For his Eagle Scout project, Mike Rusnak is leading the effort to construct an outdoor stream table and an outdoor picnic shelter. The outdoor stream table, along with the scale model constructed by the students, will be permanently placed in the picnic shelter. Once completed, future classes will be able to use the shelter and the materials to develop a working knowledge of soil erosion, stormwater runoff, and best farming practices! You can visit this project on the Web at:

<http://www.shodor.org/schools/fves/farmermark>



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***Sign up now for Summer SUCCEED
workshops (see insert for information)**

If you want up-to-date information, visit our WEB site at www.shodor.org or e-mail: info@shodor.org

Looking for an Internship?

Take a look inside this issue for some of the projects we are currently working on! Shodor staff are always willing to work with individuals interested in science, math and computing. Contact us for more details: info@shodor.org

Activities for Kids Science & Math Explorations for Students

Rabbits & Wolves

This activity allows the user to experiment with a model of a simple ecosystem consisting of grass, rabbits and wolves. Experiment with the system by changing many different conditions of the model such as the initial number of rabbits or wolves, the amount of food required by the wolves and rabbits, the reproductive rate of the rabbits and wolves, and many others. The goal is to try and determine how many different conditions can be changed and maintain a stable system where neither population goes extinct.

Play Rabbits & Wolves at:

<http://www.shodor.org/interactivate/activities/rabbits/index.html>

