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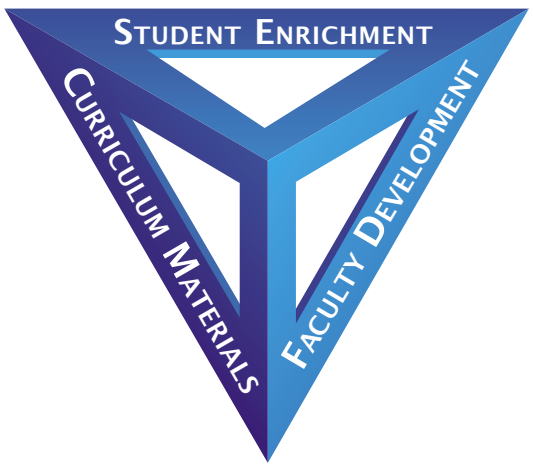
interactions

The Newsletter of the Shodor Education Foundation, Inc.



LOOK INSIDE:

Excitement, Experience, Expertise

By Matt Lathrop, Mentor Center Director

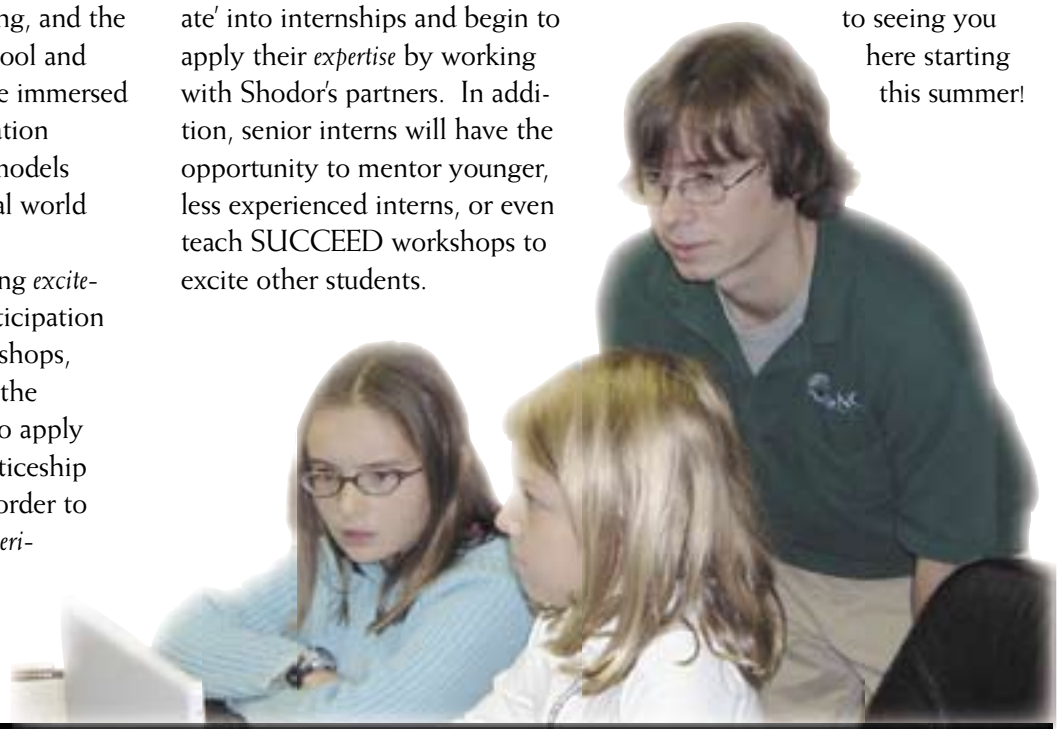
"Excitement, Experience, Expertise" This has become the hallmark of the Student Enrichment programs of the Mentor Center @ Shodor. We start with students in our SUCCEED workshops, building their *excitement* in the areas of science, technology, engineering, and math (STEM). In these workshops students participate in hands-on, group work in a technology rich environment. Studying topics such as forensic science, environmental science, mathematics, engineering, and the biosciences, middle school and high school students are immersed in exploring the application of scientific computer models and visualizations to real world problems.

After gaining *excitement* from participation in these workshops, a student has the opportunity to apply for an apprenticeship at Shodor in order to gain more *experience* in computational science. Paired with a scientist or educator at Shodor, these students learn the basic skills of collaboration and computational science while supporting the SUCCEED workshops or by helping on our curriculum and materials development projects. Giving students real work in a low-pressure environment allows them to sharpen their skills and branch into areas previously unknown to them.

Upon completion of a successful apprenticeship students 'graduate' into internships and begin to apply their *expertise* by working with Shodor's partners. In addition, senior interns will have the opportunity to mentor younger, less experienced interns, or even teach SUCCEED workshops to excite other students.

So there you have it: *excitement, experience,* and *expertise* all under one roof. While we currently have a full roster of interns for this summer, there are plenty of SUCCEED workshops available for middle and high school students to get started on the path to *expertise*! You can find a full schedule of our summer workshops on page 3 of this newsletter, or contact Mentor Center Director Matt Lathrop by phone at (919) 286-1911.

We look forward to seeing you here starting this summer!



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Great Developments

Shodor would like to welcome returning staff member, Bob Gotwals, who rejoins us after three years as the Associate Director of the Morehead Planetarium and Science Center at UNC-Chapel Hill. Bob is returning to his scientific roots as a computational science educator after significantly impacting one of North Carolina's historic science education facilities.

Shodor's website has been selected for inclusion in the book *101 Best Web Sites for Secondary Teachers*, written by James Lerman and published by the International Society for Technology in Education (ISTE).

Four staff members from Shodor participated as judges in the Brogden Middle School Science Fair. Kent Robertson, Patricia Jacobs, Garrett Love, and Matt Lathrop participated as judges in the Brogden Middle School Science Fair. They helped award projects projects in the fields of technology, physical science, biology, and environmental science.

Four Shodor staff participated in a nationwide videoconference for NSF's redesign of its Course, Curriculum, and Laboratory Improvement (CCLI) program. Bob Panoff served as the regional facilitator for the videoconference held at MCNC in Research Triangle Park, March 29, 2005.

Matt DesVoigne and Kent Robertson represented Shodor at the March 30 meeting on Internationalizing the Science Curriculum sponsored by Asia Society and the North Carolina Science, Mathematics, and Technology Education Center.

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:
Where are they now?

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 intern Ryan Niedzialek, who will be leaving us this May for a full time position in Atlanta.

By Ryan Niedzialek, Senior at UNC-Chapel Hill and a graduate of Southern High School in Durham

Ryan leads a Modeling Your World workshop in 2004

My name is Ryan Niedzialek and I am graduating from UNC-Chapel Hill this May with a bachelors of science in Computer Science. I was an intern at Shodor this past summer, and have continued working there to this date. My experience at Shodor has been simply amazing. I have had the opportunity to take part in so many different projects. I was involved in curriculum planning, workshop instruction, and software programming. Through my involvement with Shodor I have been able to learn valuable skills that will prepare me for my future. Shodor allowed me to take on responsibilities from the beginning. I was able to set goals for myself that I met on a weekly basis.

My experiences at Shodor have made me much more attractive to potential employers during my job search. I interviewed with several companies, and was able to relate all of my answers to specific situations at Shodor. My interviewers loved to hear about my experiences there and always asked me to elaborate upon them. I received offers from several companies and after a long decision process decided to accept the offer from Deloitte Consulting in Atlanta where I will be using my computer science background in the consulting field. I would like to formally thank Shodor for giving me the opportunity to work, learn and experience so much.

Facilities Update

By David Hillman, NCSI Program Assistant

Since our last newsletter we have set several priorities for the future, including staffing, projects, and resources. While we look for ways to expand the resources available through Shodor, expanding and improving physical space is the highest priority. Currently, the downtown area of Durham offers the best possibilities for our new office and teaching center.

About eight local properties have been considered. Shodor would like to thank Bill Kalkhof and Sherry Kinlaw of Downtown Durham Inc. and Alice Sharpe from the city's Office of Economic Development for their help in identifying potential locations. Very positive discussions with these individuals led to possibilities that might otherwise have been overlooked.

Our goal is for the new environment to better reflect the quality of our work; something that we hope will aid both our efforts to expand and to acquire more permanent funding. Moving to an office in downtown Durham would maintain our proximity to Duke's campus, North Carolina School of Science and Math, and the Durham School of the Arts. Furthermore, it will address a concern raised in the last *Interactions* newsletter: the new space will assuredly be both safe and appropriate.

Shodor's desire to expand the Mentor Center internship program is a large motivation for considering the move. A larger office will help us to accommodate the ever-increasing number of interested and qualified students while we simultaneously work to expand the funding available to support them.

The Durham skyline. Shodor's new home?

Shodor would again like to thank all of those who donated during our recent fundraising efforts; your contributions have helped make all of this possible.

Honorary Doctorate Awarded to Shodor's Executive Director

By J. Baker Maultsby, Assistant to the Vice-President for Planning and Marketing at Wofford College

With guidance and assistance from Shodor's director, Dr. Robert Panoff, students at Wofford College in Spartanburg, SC have the opportunity to take part in an academic program with an emphasis in the computational sciences.

Students in the interdisciplinary program take courses in mathematics, computer science and the science major of their choosing. For example, Wofford's biology professors and students have worked together on computer models of the malaria virus. In addition, numerous Wofford students have gone on to prestigious internships.

Wofford's interdisciplinary approach is a "breath of fresh air," said Panoff. He added, "Wofford as an institution and faculty have such clear focus on educational experience for students." That focus has been sharpened by the expertise of Panoff, who became involved with Wofford's faculty several years ago after being contacted by computer science professor Angela Shiflet.

In recognition of the impact he has made at Wofford and other schools, Panoff will receive an honorary degree from Wofford at its graduation this May. Panoff has visited Wofford, a liberal arts college of about 1,100 students, on a number of occasions, conducting workshops for professors across a variety of science disciplines.

Students are the ultimate beneficiaries of the training.

Junior Lena Sandifer, a biology major, hopes to go on to medical school after finishing Wofford, and she believes computational science will make her better prepared to do research. She pointed to a variety of ways computers can enhance research in biology. "You can model a protein and see how a drug would affect it and get a visual representation of what's going on in the body," she explained.

This summer, Sandifer will be taking part in an internship at the University of California-San Diego, where she will work on a project to model electrical activity in the heart.

Shiflet is confident that Wofford is on the right track with its computational sciences emphasis. She believes that scientists are looking for "hybrids" – college graduates with traditional training but who can also put to use advances in computer technology. "We're able to place (students) all over the country – they get hired on the spot. (Others are) getting into graduate school and getting great positions later."

Panoff believes the work going on at Wofford can serve as an example for other liberal arts colleges. Wofford, he said, "is providing leadership in the liberal arts college community in demonstrating how departments can work together to incorporate computational sciences in ways that can lead to changes in how biology is taught, how chemistry courses are taught, how physics is taught, and so on."

Shiflet believes Panoff deserves much of the credit: "He is an education leader," she said. "He is generous and passionate about computer science and modeling. (He does) everything he can to promote people doing good science and computational science."

More information on Wofford's computational sciences program can be found at www.wofford.edu/computerScience/emphasisCS.asp.

Professor Shiflet teaches a pair of students at Wofford College

SUCCEED Summer 2005 Calendar:

To apply: www.shodor.org/succeed — (919) 286-1911

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

Event	Dates	Times	Grade Levels	Workshop Fee*
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	Aug 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.*

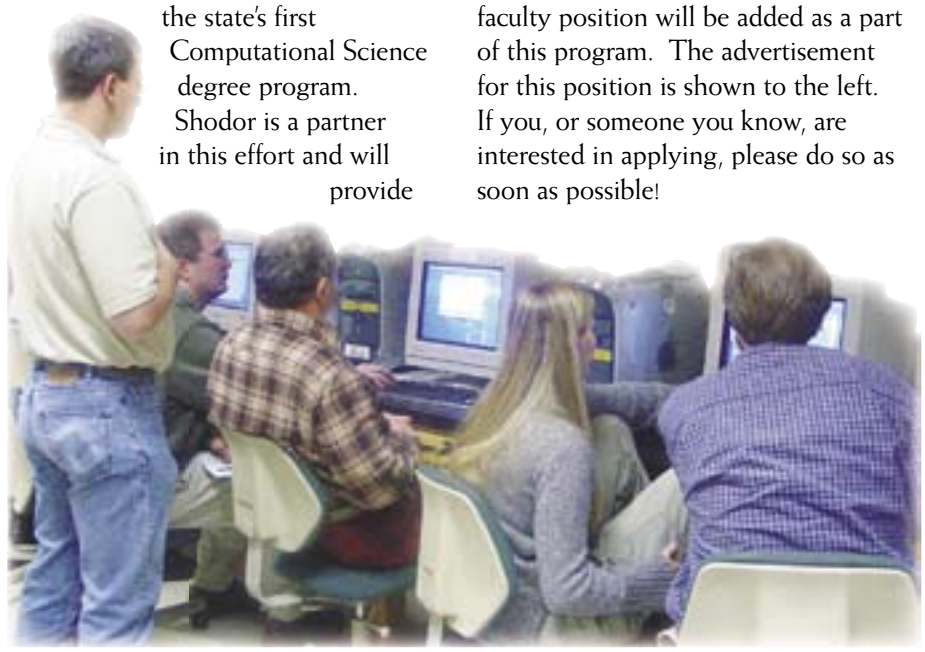
NORTH CAROLINA CENTRAL UNIVERSITY, Computational Science Faculty Position. The College of Arts & Sciences at North Carolina Central University is developing a multidisciplinary B. S. degree program in Computational Science, with a core focus on the areas of applied mathematics and numerical methods, algorithms and software tools for modeling and simulation, high performance computing, and scientific visualization and imaging. New courses that focus on these core areas will be developed. The program will also serve to integrate faculty and existing courses from various departments in the College, including the departments of Biology, Chemistry, Environmental Science, Geography & Earth Science, Mathematics/Computer Science, and Physics. The successful applicant will have an earned doctorate in science, engineering, or applied mathematics and a research background relevant to one or more of the core focus areas in computational science as listed above. Requirements include a strong commitment to undergraduate teaching, course development, active integration of diverse departmental programs, and pursuit of a vigorous, externally funded research program. Applications should include a detailed vita, research plans, statement of teaching philosophy, and three letters of recommendation. All materials should be forwarded to Dr. Mattie Moss, Computational Science Search Committee, NCCU, 1801 Fayetteville Street, Durham, NC 27707. E-mail: mmoss@nccu.edu. NCCU, an EEO/AA employer, complies with the Immigration Reform and Control Act of 1986. All new employees must provide original documents verifying identify and employability within the first three days of employment with the University. Accommodations for applicants who qualify under the American with Disabilities Act or section 503 of the Rehabilitation Act of 1973, as amended, are available upon request.

Partnering with NCCU

By Shawn Sendlinger, Associate Professor of Chemistry at NCCU

Collaboration between Shodor and North Carolina Central University (NCCU) has taken many forms over the years. NCCU served as the host site for the first Shodor Computational Science Institute (SCSI) workshop during the summer of 1998 with a number of NCCU faculty in attendance. Since then, several grants written by NCCU faculty have included training provided by Shodor, and many seminars and workshops have been held on campus. In 2004, Shodor and NCCU 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.

More recently, the University of North Carolina — Office of the President has awarded NCCU a planning grant to establish the state's first Computational Science degree program. Shodor is a partner in this effort and will provide both faculty training and consulting on the program's design. A new NCCU faculty position will be added as a part of this program. The advertisement for this position is shown to the left. If you, or someone you know, are interested in applying, please do so as soon as possible!



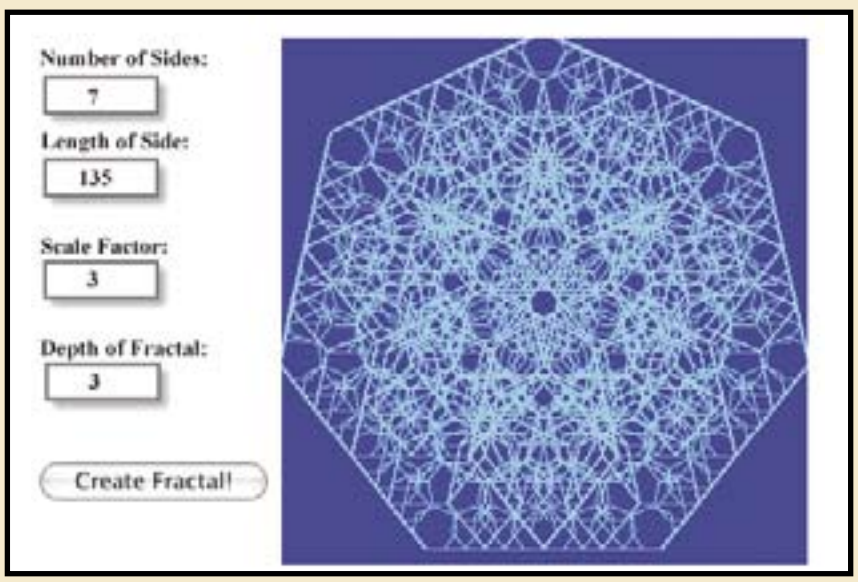
Garrett Love leads a faculty development workshop.

Have you wondered what all the hubbub over this relatively new and esoteric concept called a "fractal" is all about? Well, prepare to enlighten yourself by exploring the many interactive fractal activities available on Shodor's **Project Interactivate** website.

Activities for Kids

By Bethany Hudnutt, Project Interactive Manager

The concept of "fractal" has become quite popular in modern mathematics, partly because they are visually impressive, but more so because of their usefulness in many areas of science. It turns out that the geometry of a fractal is much more descriptive of Mother Nature's geometry than traditional Euclidean geometry. A fractal is simply a geometric object such as a polygon, a line, or shape that is deformed repeatedly in the same manner to form a geometric sequence. The interesting patterns that result are often pleasing to the eyes as well. The activity shown here is *Fractured Pictures*, which allows you to create a regular polygon and then specify parameters to create intricate shapes. Play with this activity and ten other fractal activities within Project Interactivate for fun and to learn more about the wonderful world of fractals!



Fractured Pictures can be found at:
www.shodor.org/interactivate/activities/fractured

Visit www.shodor.org/interactivate/activities/#geo to explore these other Fractal activities:

Hilbert Curve Generator
Another Hilbert Curve Generator
Koch's Snowflake
Sierpinski's Triangle
Sierpinski's Carpet
The Chaos Game
Fractal Dimensions
Flake Maker
Julia Sets
Mandelbrot Set