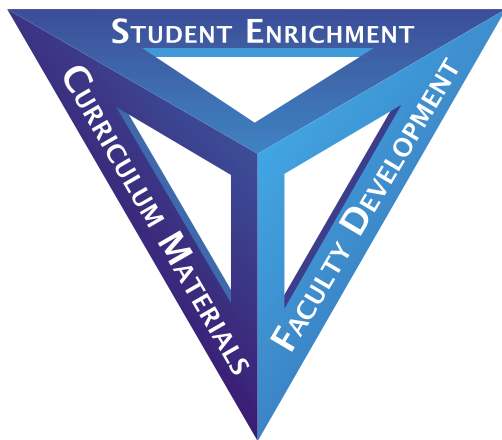




Newsletter of Shodor: a national resource for computational science education



Student Workshops “SUCCEED”

By Luke VanOort, Computational Science Apprentice/Intern

You might not expect to see crime scene investigation, cryptography, graphic design, Internet programming, gas mileage, environmental science, the life cycle of a fly, and mathematical models all covered by one summer workshop program—that is, unless you are familiar with Shodor’s Project SUCCEED, which just completed its tenth successful year.



Students investigate a fictitious crime scene during the Forensic Science workshop.

and defended their evidence in a mock trial using their new knowledge.

In the Biomedical Sciences Workshop, students constructed models of molecular structures both on their computers and by hand, using Skittles candies as building blocks. This was a “flavor” of science the students very much enjoyed.

Workshops often teach students how to model real-life scenarios on the computer. Through modeling, different outcomes can be seen as they develop when specific aspects of a virtual world are modified. For example, In the Modeling Your World workshop, students

used a numerical modeling program, Vensim, to model and demonstrate how diseases spread in a human population. Students tested methods for

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Once again this summer, Shodor offered SUCCEED workshops for middle and high school students on a variety of subjects. The common thread tying these workshops together is their focus of using computers to aid in studying science and math. Through these workshops, students learn computer skills along with several specific subjects. The only thing required to enjoy a Shodor workshop is a thirst for knowledge.

In the Forensics Workshop, students were challenged to solve the mystery behind a fictitious crime scene. Leading up to the investigation, students explored several forensic methods, including forensic animation, which is the use of computer animation to clarify events of a crime, decryption, which is the process of decoding encrypted messages, and gel electrophoresis, a method used by Crime Scene Investigators (CSIs) in DNA analysis. Each student took a role (such as biologist, cryptographer, or animator)



Students in the Biomedical Sciences workshop witness firsthand how different food products can react.

LOOK INSIDE:

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- Local Employers talk with Shodor Apprentices about Technology Careers
- CSERD Portal Welcomes Computational Biologists



Great Developments

Shodor Welcomes New Staff: Pam Hester is our new Financial Manager. Previously, she worked for Boatwright Distribution in Raleigh and The Arc of Durham. When she's not working at Shodor, Pam enjoys gardening, writing, and spending time with her grandchildren. **Joel Feiner** joined our staff as a Computational Scientist after his graduation from UNC in the spring (see graduates list on page 4). Since 2005, he has worked as a Shodor intern doing Java programming for our Interactivate website and systems administration. As staff, Joel will be managing several web programming projects, and will spend more time teaching and mentoring our apprentices and interns. He will continue doing Java and systems administration on the side, because he likes it. On the side, Joel enjoys tinkering with Linux and reading Harry Potter. **Ernest Edinboro**, another former Shodor intern, has joined us as a full-time coordinator and mentor for the Apprenticeship Program. He has a degree in Art from Slippery Rock University and a degree in Web Design from ECPI College of Technology (see graduates list on page 4). For the past seven years he has been the Assistant Art Lab Manager at UNC mentoring undergraduate students. Ernest has a wide variety of skills to offer Shodor, from teaching to graphic design. He is excited to be working with a new group of students.

Cisco Recognizes Shodor with National Award: On October 9th in Redwood Shores, CA, Shodor was recognized on the national level for its innovative use of networking technology at the Cisco Growing with Technology Awards 2007. Shodor was the Grand Prize Winner in the Non Profit Category. There to accept the award and represent Shodor were Bob Panoff, President and Executive Director, and Monte Evans, Shodor's first intern. Prior to the awards ceremony, Bob and Monte were among a small group of attendees who met Cisco CEO John Chambers personally. Cisco states that the winners of the program represent their industries and constituencies as role models, showcasing best practices on the use of technology to address business challenges, fuel success and compete more effectively. We were thrilled to be chosen!

Shodor Apprentice Hosts Durham TV Show: Angelica Powell, a student in Shodor's SUCCEED Apprenticeship Program, has been chosen as one of the hosts of "Durham Teen Scene." This local cable show discusses things that Durham teens are doing, challenges they face, and things they need to know such as the importance of "Time Management." The first broadcast has already aired on Time Warner Cable channel 8 and we look forward to seeing her in future broadcasts at these times: Mondays at 6:30 p.m. and Tuesdays at 9:00 p.m.

Shodor Staff

President & Director Robert M. Panoff, PhD	Apprenticeship Program Coordinator Ernest Edinboro
Project Interactivate Manager Bethany Hudnutt	Computational Scientist Valerie Gartland
Associate Director Patricia Jacobs, MS	Communications Coordinator Mary Paisley
Computational Science Educator Kent Robertson	Graphics and Web Designer Jonathan Stuart-Moore
Computational Biology Educator Jeff Krause, Ph.D.	System Administrator Simon Karpen
Staff Scientist Linda Schmalbeck, PhD	Financial Support Joyce South Pam Hester
Computational Scientist Matt DesVoigne, MS	International Staff Diana Tanase, MS
Computational Scientist Joel Feiner	Educational Consultant Ron Broadnax
	Web Developer Ismael Torres

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stopping an epidemic— without the risk of getting a single real person sick!

As you can see, Shodor workshops cover a wide variety of interesting topics and disciplines. You can always learn something new at a Shodor workshop.

SUCCEED WORKSHOPS AVAILABLE THIS FALL!

To learn more about Shodor's schedule for Project SUCCEED Saturday Explorations in Science and Math, half-day workshops for 6th – 8th grade students, visit <http://www.shodor.org/calendar>.



Group members in the Shodor Scholars Program prepare their final project.

SUCCEED Fall 2007 Calendar:

Event	Dates	Times	Grade Levels	Workshop Fee*
Fall Saturday Explorations	October 13, 20, 27 and November 3, 10, 17	9am-12pm	6th-8th Graders	\$175

*Need-based financial assistance is available: no qualified student will be turned away for financial reasons. For more information on SUCCEED Workshops, visit www.shodor.org/calendar

Farewell to Staff

As often happens at Shodor, some of our "post-bac" staff are moving on this fall to pursue other professional adventures.

Monte Evans, who joined Shodor as a middle school student in 1994 and served as our first intern, left Shodor's staff in August to pursue his Master's Degree in Library and Information Science at UNC-Chapel Hill.

Monte was one of the first members of the Shodor family and has literally grown up with the organization. He is responsible for many of the great materials on our website, and has long been one of our students' favorite instructors due to his exuberance and sense of humor. We wish Monte the best! For a great article about Monte

written last spring, visit http://bwfund.org/focus/spring_2007/monte_evans.html.

We say another farewell to **Deb Hussey**, who has worked as staff since the winter of 2007. Deb started as an intern at Shodor in the summer of 2006 and began working here full time after graduating from the State University of New York at Brockport with degrees in Computational Science and Mathematics. Deb has made substantial contributions to Shodor's website, taught in workshops, and has led the math mentoring program for apprentices over the past year. She will be joining Blue Cross Blue Shield in Chapel Hill as a Java programmer. We wish her success!

Lastly, **Calandra McNeill**, who served as program coordinator since January, recently joined IntraHealth International in Chapel Hill as their Quality assurance and Training Officer. Calandra began working at Shodor as an intern in January 2006, specializing in quality assurance for our *Interactivate* website. Under her leadership, a sweeping update to the site was tested rigorously before its release in August 2006. She joined the staff in January 2007 as program coordinator, managing our SUCCEED Workshops and Apprenticeship Program. In spring 2007, Calandra graduated from ECPI College of Technology with an Associate's Degree in Web Design. We wish Calandra the best at her new location!

Summer at Shodor

Interns: An Essential Part of Shodor

By James Broadnax, Computational Science Intern

Shodor has a lot of work on its hands, from spreading knowledge about computational science through workshops for educators and students to maintaining quality curriculum materials on its website. Exactly how does Shodor's small staff, which is often interacting with students and educators, get all of the essential tasks done? The answer is simple: Interns!

For more than ten years, Shodor has employed interns with wide ranging backgrounds and interests not only to lighten the workload for the staff, but also to multiply productivity and provide a great learning experience for students. Interns benefit by exploring many new skills in a professional office setting. Shodor's interns are primarily college level and advanced high school students, but we also have a few graduate students and post baccalaureate interns as well. While their experience levels vary, one thing that all Shodor interns have is a valuable combination of people skills and technical expertise.

So what exactly do Shodor interns do? Interns are given many different tasks, including Java programming, workshop curriculum development and teaching, graphics and website design, quality assurance testing of our educational software, and system administration. Interns have an area of specialization, which is their primary focus for the entire summer, as well as a variety of side projects.

Teaching is one of the most important things that interns do. Each intern is assigned at least one day of teaching for a summer workshop. Workshop students are in either middle or high school. The intern must develop the curriculum for the class, rehearse and revise their lesson plan with a mentor, and then do the actual teaching.

Intern Ebonee Farrow, a junior at High Point University, focused this summer on curriculum development for workshops as well as debugging java applets. She was responsible for co-leading the Shodor Scholars Program, a two-week workshop for advanced students who are interested in pursuing apprenticeships at Shodor.

"Teaching is fun and rewarding!" said Ebonee. "It helps you develop public speaking skills."



Biomedical Sciences students watch as Jason Jones, intern, demonstrates the chemistry software WebMO.

Jason Jones, another intern, attends UNC Chapel Hill. This summer, he worked on the North Carolina High School Computational Chemistry Server. For Shodor's summer workshops, he taught about environmental science and biological science, and how to use the molecular modeling software called WebMO.

"Teaching is really rewarding but difficult," said Jason. "Sometimes you can't fully express thoughts in the time allotted," he explained.

This summer, interns had a great time teaching as well as working on their assigned projects. They say that they love their job and their peers. Jason Morrell sums it up by saying "I've met a lot of cool people and have a good time at work."



Intern Heather Marvin mentors a student during the Graphics and Visualization workshop.

Shodor Congratulates its 2007 Graduates

Students working at Shodor who have graduated this year, and what they will do next:



KATE BRADY
Emerson Waldorf High School
Shodor Apprentice since November '05
"I have enjoyed being at Shodor because it allows me to learn outside the classroom."
Kate begins at Carnegie Mellon University in Pittsburgh, PA this fall.



ERNEST EDINBORO
ECPI School of Technology
Associate's Degree in Web Design
Shodor Intern since January '07
"Being here at Shodor has helped me grow into a business person and get experience in various computer fields. Two things have come from my experience at Shodor.

Since I spent most of my time working with the workshop kids I was reminded that I like teaching. Shodor also has been very instrumental in reinforcing the programming skills I learned in school."
Ernest will be starting to work full time at Shodor this fall.



JOEL FEINER
UNC-Chapel Hill
B.S. in Computer Science; B.A. in Linguistics
Shodor Intern since Summer '05
"I've gained a great deal of practical experience here at Shodor, which was a great complement to things I was learning in school."
Joel started full time at Shodor this summer. Eventually, he plans to find another job for a year or two, and then attend graduate school.



JENNA INGERSOLL
Sewanee: University of the South
B.A. in Philosophy, Minor in Music, cum laude
Shodor Intern since Summer '00
"I greatly appreciate all of the experience that Shodor has given me over the years, and how

the work I've done here has affected my opportunities elsewhere."
Jenna co-led the Shodor Scholars Program workshops this summer. She recently accepted a professional position at New Horizons Learning Center in Chattanooga, TN, where she will teach classes on computer applications."



BRITTANY JONES
Jordan High School
Shodor Intern since Summer '07
"Here at Shodor, I have learned so much more about computers that I never knew before, and there is so much more to learn because of the growing field of technology."
Brittany now attends Elon University, majoring in Leisure and Sport Management with a minor in Business Administration.



ALEX KESLING
Emerson Waldorf High School
Shodor Apprentice/Intern since November '05
"Shodor has offered me the ability to explore curriculum which my high school did not offer."
Alex is currently attending both Alamance Community College and Durham Technical Community College. He hopes to be attending NC State next year, majoring in Computer Science.



HEATHER MARVIN
School of Communication Arts
Associate's Degree in Digital Media, with honors and Valedictorian of class
Shodor Intern since February '04

"Shodor has helped me grow into a business person as well as get experience in various computer fields. Shodor has been a big asset to my success as a graphic designer. Even while in college, my professors were impressed with the knowledge and experience I had gained as a computer graphics intern at Shodor. I can honestly say that I would not be as far ahead as I am in my field without the experience I have gained from being at Shodor."

Heather has continued to work for Shodor since graduation. She hopes to find a position as a graphic or multimedia designer. For the long term, she would like to establish her own studio/design firm.



CALANDRA MCNEILL
ECPI School of Technology
Associate's Degree in Web Design
Shodor Intern since January '06; Staff since January '07

"Being here at Shodor has helped me grow into a business person as well as get experience in various computer fields."
After working as Shodor's Program Coordinator for the past year, Calandra is now starting as Quality Assurance and Training Officer at IntraHealth International in Chapel Hill.



JASON MORRELL
Durham Technical Community College
Associate's Degree in Applied Science in Computer Programming
Shodor Intern since January '07

"Being here at Shodor has taught me that learning doesn't stop when you graduate, it's just the beginning."

Jason will stay at Shodor this fall to work on several programming projects.



LATEASHA SHIRER
Middle College High School
Shodor Apprentice/Intern since Fall '05

"I learned that I like to teach and that I am a good teacher. Shodor is a great place for a person to grow!"
Lateasha begins at Winston-Salem State University this fall.

Quotes from Summer 2007 at Shodor

Some interns and apprentices respond to their summer experiences:



"My best experiences and biggest challenges have been learning about different kinds of computer programming, meeting people with similar interests to mine, and at first wrapping my mind around the concept of computer programming." – Gavin Borg, Junior at Durham School of the Arts



"I was able to prepare for two semesters of intensive chemistry curricula at UNC by working with the computational chemistry server and the server-based interface WebMO. By creating organic chemistry documentation for high school students taking a chemistry class in North Carolina, I was furthering my own knowledge of the subject and understanding more material about my major." – Jason Jones, Sophomore at UNC – Chapel Hill



"This job has helped me develop skills that I didn't have before. I now know how to... test machines, come up with curriculum, and use two operating systems." – James Broadnax, NC State University



"Since my internship at Shodor, my college major intentions have gone from completely nebulous to almost definitely a major in Computer Science." – Samuel Leeman-Munk, Sophomore at Earlham College



"Since I had nothing else to do my parents forced me into it. Boy was I glad they made me! I was put in the Braille group, [and] I quickly made friends with all of them. I also met other kids around the office. I hope my schedule will permit me to come back." – Caleb Meredith, Sophomore at Jordan High School



"This summer, I worked on test scripts for several Interactivate applets... The theme of my project was QA: Quality Assurance. I tested activities to make sure they were top quality with no bugs or confusion for the users." –Mindy Yuan, Sophomore at East Chapel Hill High School



"This experience helped me realize that I have so many opportunities after I graduate. I really enjoyed working with the interns and apprentices because they were all so talented in the fields they specialized in." – Maria Fedore, Senior at Elon University



"It is the combination of such knowledgeable staff and colleagues, coupled with the resources that Shodor provides and the emphasis on learning by doing that makes Shodor such a great breeding ground for learning. I have been able to be helped by and to give help to many other office members at Shodor." – Alex Lew, Senior at Riverside High School



"Through some NCSI projects, I had [the chance] to work on web-based programming. The most important lesson I learned was how to work together." – Junhyun Hwang, NC State University



"Everyone at Shodor, at one time, asks another person for help on something or another. You are never limited to your specific group members when you need help. The other interns/apprentices have a plethora of knowledge that is on tap to anyone who asks." – Trevor Marks, Junior at McIntosh High School



"The most valuable lesson that I learned here was that everything moves faster when you work together." – Evan Jonson, Sophomore at Emerson Waldorf High School



Meet Ebonee, Student and Mentor Extraordinaire!

A Durham native, Ebonee has been a part of the Shodor family of students since 1998, when she attended her first workshop for middle school students. She is now a graduate of Northern High School and a junior at High Point University, majoring in computer science.

When she was young, Ebonee aspired to one day become an engineer or an architect. She remembers spending much of her time modeling and building things with Legos and K'nex, and breaking things just so that she could put them back together.

Now, as a nine year veteran of Shodor, Ebonee is a true leader among the students. This summer, along with fellow intern Jenna Ingersoll, she led the Shodor Scholars Program workshop, designed for advanced students who are interested in pursuing apprenticeship and internship opportunities at Shodor. As a

mentor, a teacher and a student, Ebonee is a glowing example of Shodor's success in working with local students.

Here, Ebonee shares with us her experience at Shodor:

"After participating in every workshop possible for middle school students by 1998, I had so much fun and enjoyed being around the instructors so much that I didn't want to leave Shodor. I really liked learning how to use the computers and the programs that I had been shown while in the camps. So when I heard that I might be able to volunteer at Shodor, I decided to ask about the opportunity and spent the next 2 summers volunteering.

My first assignments at Shodor involved documenting the workshops. This involved writing overviews, taking pictures, and posting these along with the daily reports written by the workshop students online.

I had learned so many new things and became so interested in math, science, and technology at Shodor, that at 14, rather than doing what many of my friends were doing and finding a job at the mall or a fast food restaurant, I wanted to work at Shodor. I expressed interest in this opportunity to Dr. Panoff and he hired me as a summer intern.

As an intern, my first fairly large project required me to learn some javascript, and more about graphic design. As summers passed, I began helping to teach the workshops held at Shodor and also learning more about programming languages and computer programs in general.

Last summer, I participated in the Super Computing '07 planning conference at Argonne National Lab in Illinois. I had the opportunity to collaborate with professors, teachers, and scientists along with a few college students. I also assisted Dr. Panoff with a faculty development workshop

held at Chicago State University.

This summer, I spent much of my time working with SUCCEED workshops, programming applets for Interactivate, and assisting in a Technology Enhanced Learning of Science (TELS) workshop at NCCU. My largest project for this summer was planning and teaching the Shodor Scholars Program along with a fellow intern, Jenna Ingersoll.

As a rising junior at High Point University, I am majoring in computer science. I feel as though my Shodor experience has definitely been a major factor in the career path I have chosen. The atmosphere at Shodor is very friendly and I enjoy returning here because I learn something new every summer. The encouragement of one another among the staff, interns, and apprentices is very unique. I am very glad to have had the pleasure of being a part of this program. It has been a wonderful privilege working here and surely unforgettable."



Ebonee mentors a student during the 2007 Shodor Scholars Program.



Ebonee teaches a session on computer programming during the summer of 2006.

Local Employers talk with Shodor Apprentices about Technology Careers

By Zhi Chen, Computational Science Intern

This summer, Shodor's SUCCEED Apprenticeship Program held a first-time series of career presentations by professionals from local Triangle Area employers, including Cisco Systems, UNC-Chapel Hill, Quintiles Transnational, Red Hat/Fedora Project, RTI International and SAS Institute.

Our 50 apprentices, 30 interns, and workshop students were able to hear stories and perspectives firsthand from successful individuals. The speakers discussed their respective journeys in reaching a career, emphasizing education, professional experience, and the importance of building contacts.

Many students commented that the talks gave them inspiration and a lot of new ideas about career options. Fola Omofoye, a volunteer intern, called the presentations

"enlightening" and said, "it showed me a variety of things and options I could explore in the future." Apprentice Deandra Anderson said, "I learned a lot about the career pathways in the computer technology field."

The question and answer period after each presentation gave students time to ask exactly what they had on their minds, and presenters stayed afterwards to talk one-on-one with students. Alex Kesling, a system administration apprentice/intern who had worked in-depth with Red Hat's Fedora software, said, "it was a good experience to meet with the Red Hat Fedora Project leader!"

One of Shodor apprentices, Trokon Morgan, later contacted the presenter from Cisco Systems, who invited him to visit his office for the day. On August 2nd, Trokon

shadowed two of Cisco's interns from NC A&T University – a unique and inspiring experience for him.

Shodor exists not only to help improve math and science education itself. We also strongly encourage students to pursue an education and career with a focus in science, math, engineering and technology. Our local programs for students, including the SUCCEED Apprenticeship Program, offer unique opportunities to explore these fields.

We are planning to continue guest presentations with a career focus during our fall apprenticeship programs.

Shodor would like to thank each of the individuals and organizations who participated in our presentations this year!



Shodor apprentice Trokon Morgan (center) with the two Cisco interns he shadowed for a day.



Apprentices and interns talk with Rene Daughtry of Cisco after his presentation.

Intern Opportunities Available!

We are seeking college students with experience in one or more of the following areas: Quality Assurance, Programming (Java, Flash, MySQL, PHP), Database Administration, Network/System Administration and Graphics/Web Design. Paid internships range from \$7.50 - \$12.00 per hour, depending on experience.

FLEXIBLE SCHEDULING! A minimum of 10-15 hours per week may be fulfilled during weekdays between 9 a.m. and 6 p.m., and Saturdays between 9 a.m. and 3:00 p.m.

Apply online at www.shodor.org/mentorcenter/application.

CSERD Portal Welcomes Computational Biologists

By Jason Jones, Computational Science Intern

If you have been to a Shodor workshop or used Shodor's online math and science materials, you have probably used Shodor's Computational Science Education Reference Desk (CSERD) at <http://cserd.nsd.org/>. A catalog of quality resources from across the internet, CSERD is also a partner with the National Science Digital Library (NSDL).

But CSERD is about to add an exciting new feature! Still in development under the direction of computational biologist Jeff Krause, with involvement of computational scientists and educators, CSERD is adding a portal for computational biologists. Biology is the first subject to receive a focused portal in CSERD to help educators and students find what they are looking for.

The biology portal will enable the end user to more easily find tools within CSERD's vast resources that relate specifically to the biological sciences.

"As the collection of resources listed in CSERD grows, we are trying to make it easier for educators and students to find resources in a particular area of application," Jeff stated.

Hierarchical biology topic outlines will link to related computer-based tools housed in CSERD, and to topic overview pages.

Jeff continued, "Biology and other domain-specific outlines allow users to browse for resources using the concepts and terminology of that subject. The topic overview pages provide

descriptions of the mathematical and computational approaches that are being applied to particular scientific topics." The topic overviews will contain course and lesson guidelines.

The portal is also being used to continue CSERD's efforts to create guidelines, templates, and best practices for publishing scientific content online. Such guides will help educators to develop their own materials. Shodor will freely host and catalog these external materials through the CSERD website. This will make it easier for science educators worldwide to incorporate more math-based, computational science tools into their curriculum, and to share tools with each other.

Check out our FREE online tools...



The Computational Science Education Reference Desk (CSERD)

cserd.nsdsl.org

Shodor is one of eleven pathways nationally charged with providing the scientific content for the National Science Digital Library (NSDL). Shodor develops and maintains CSERD as a peer-reviewed resource in computational science education.



MASTER TOOLS

shodor.org/master

These online interactive tools and simulation environments can be used to teach and explore mathematical and scientific modeling. They are designed to enable and encourage exploration and discovery through observation, conjecture, and modeling.



INTERACTIVATE

shodor.org/interactivate

This popular set of interactive online materials for math and science education is geared for grades 3–12.



COMPUTATIONAL CHEMISTRY

shodor.org/chemistry

North Carolina's high school chemistry students and teachers

have free access to a dedicated research-level computer that supports advanced computing in chemistry.



SUCCEED CURRICULUM

shodor.org/succeed/curriculum

This collection of activities and lesson plans is adapted from Shodor's own workshops, incorporating computational elements into math and science explorations.



DEAF STEM

shodor.org/succeeddbi

These online lessons and activities have corresponding sign language videos for hearing-impaired students and their instructors.



BRAILLE

brl.org

This site provides educators,



a national resource for computational science education

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