

## High School Biotechnology Challenge Weekend



Students learned important principles of genetic engineering, specifically functions of restriction enzymes and their use as a molecular biology tool.

Early on the morning of March 21<sup>st</sup> buses from across RI rolled onto the URI campus and dropped off 96 eager high school SMILE students ready to undertake the 2014 Biotechnology challenge.

After meeting at Weaver auditorium to sign in and receive their t-shirts, 98 students from 6 school districts were divided into groups and assigned their challenge rotations. The students were then ready to begin their busy weekend of events designed to showcase current research and new technologies in the fields of and Bio-technology and Pharmacy. Students either spent the morning in the labs in the Center for Biotechnology and Life Sciences building (CBLS), investigating recombinant DNA technology techniques by conducting a lab experiment in Restriction Digestion and Analysis of Lambda DNA; or in the Pharmacy building participating in several activities showcasing cutting-edge research in Pharmacy. In the afternoon, the groups swapped places so everyone experienced all the activities.

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## URI Mentors

URI mentors are an invaluable resource for SMILE students, and one of the strengths of the program.

URI mentors facilitate the development of positive relationships by creating socially supportive community of learning where SMILE students can picture themselves and their future in a new and exciting way.

At the Challenge Weekend students learn about college life, interact with college mentors, and gain confidence that they will also go to college. The diversity of mentors reflects SMILE's diversity of students, from ethnic background to interests. Let's discuss what makes mentors such an integral part of SMILE.



Jhoset Burgos-Rodriguez, Biology graduate student, conducted the Biotech lab and a biodiversity activity

*continued page 4*

## High School Biotechnology Challenge Weekend



At the URI AMGEN Biolabs high school students worked in groups of 4 to 5 students.



Cutting plasmid DNA with restriction enzymes



Running a gel electrophoresis  
Analyzing the migration distances and sizes of the DNA fragments.



Central to the weekend was a biotechnology labs that the students conducted in mixed-school teams. To prepare for the challenge SMILE club leaders conducted six weeks of pre-activities that led up to the Challenge Weekend.

High school students were doing college-level science in state of the art new labs donated to the College of Environmental and Life science by AMGEN, and at the same time were meeting new people, and were building new teamwork skills in the process.

Students got to interact with mentors from various areas. There were many URI student mentors who volunteered their time with SMILE students. Many came from NSBE (National Society of Black Engineers), and there were also independent URI students who just wanted to help out. All of these positive role models made the experience much more enriching for students. The high academic expectations and professional environment gave students a feeling of excellence and valid self-esteem.

To give students the full college experience, they also ate in the dining halls and enjoyed some recreation time at the Tootell Aquatic Center, as typical college students would do on a Friday night.

On Saturday, students took a walking tour of the campus, learned about the Admissions and Talent Development programs at URI and broke into groups to learn the results from water samples that the club's had previously collected.

Earlier in the year, each club placed passive samplers in a local water body to collect evidence of Persistent Organic Pollutants (POP's), nano-particles of chemicals from fragrances, soaps and other household products that are present in some concentration in most water sources. Dr. Rainer Lohmann and his graduate students are conducting research on POPs and have found extremely high concentrations of these pollutants in polar bears among other animals. This is a worrying discovery because the polar bears are at the top of the food chain, living thousands of miles from human habitation, and scientists are unsure as to what damage these chemicals will have on the animals' and our health.

After the closing ceremony where recognition was given to graduating seniors, the tired but still smiling students boarded their buses home.



### *URI Pharmacy new technology tools to improve students' learning*



### *Human Simulation Lab.*

SMILE Students interacted with 'model patients' in the Human Simulation Lab. Professor Clinton Chichester and, Amanda De-Angelis Chichester, co-director of the program, encouraged SMILE students to find pulses, listen to heart rates and monitor oxygen levels on 5 different models. The realistic human simulators can be programmed to display various symptoms, and so students were able to observe the effects of different medications on the life-like manikins, without causing any harm to a real human patient!

### *3-D Center for Biomedical Sciences.*

SMILE students learned how college students in the Biomedical fields do computer animation and print three-dimensional models of molecules. This is a hands-on approach in learning about chemicals and drugs, and how they affect the human body.



Dr. Bongsup Cho and Dr. Roberta King, Pharmacy professors introduced students to 3-D computer modeling and 3-D printing.



### *Water Quality*

### *Use of passive samplers to detect activities and gradients of organic pollutants*

Professor Rainer Lohmann, from URI's Graduate School of Oceanography, is studying persistent organic pollutants (POP) in the oceans, lakes, and atmosphere. He has developed a passive sampling technique which uses a sheet of clear plastic, to detect them in the water. In late December and into January, SMILE High School students collected water samples and placed the passive samplers in their local waterbody. After 3-4 weeks the samplers were picked up and sent to Dr. Lohmann's lab for analysis. On Saturday, Dr. Lohmann's graduate students presented the results from each school.



## MENTORS

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- 1) Mentors believe in students. Their interactions are based on the belief that students are capable of academic achievement.
- 2) Mentors help send the message that college enrollment and completion are clear goals for students.
- 3) Mentors help make science, technology, engineering, and math (STEM) fun, exciting, and in context.
- 4) Mentors guide students through problem-solving, which give them invaluable skills for the future success.
- 5) Mentors help demystify college, both the pathway to get there and the college experience. Students feel comfortable asking questions and appreciate the honest responses from mentors.
- 6) Mentors are advocates, encouragers, and supporters of SMILE students.

SMILE depends on mentors to positively impact our students.  
From you, students also learn to pay it forward!

## Thank you!

Wyston Wilson- SMILE/Talent Development  
URI National Society of Black Engineers (NSBE)  
AISES American Indian Science and Engineering Society (AISES)  
The Society of Hispanic Professional Engineers (SHPE)  
Society for Advancing Chicano Latinos and Native Americans (SACNAS)  
URI GSO Graduate Students: Carrie McDonough, Erin Marikham, Kari Pohl  
Collegiate SMILE  
Seeds of Success (SOS)  
Tau Beta Pi  
URI Student Mentors





## Citizens Elementary School

Melissa Moniz

Jodi Cifelli

We have been busy and there is a lot going on at Citizens' Memorial in Woonsocket. Students completed their study of vegetation and wildlife around our school. We also studied pervious and impervious surfaces. We learned a ton about plant life and animal life around our school. This also got us thinking and we decided we needed to add some green to our school surroundings!

Students are now working on atmospheric gases, the water cycle, and creating terrariums! Students also enjoy observing our pet chinchilla and commenting on how it is changing weekly. It is all quite exciting!

SMILE club members also decided they wanted to raise some money for an end of year celebration and also help support a field trip for other students in our school. We came up with the idea of SMILE Spirit Fridays. Students brainstormed some fun ways to show school (and SMILE) spirit and raise money. Students could participate and not wear their uniform if they donated \$1.00. Some of the SMILE Spirit Fridays included: sports day, crazy hair day, hat day, favorite character day, funky sock day, backwards day and many more! So far SMILE club has earned almost \$500 for our school fundraising effort! Students pass envelopes out to teachers, Ms. Moniz or Ms. Cifelli collect the envelopes and then we count the money, total it and make a deposit. This has really helped us to learn how to set a realistic goal and work hard to see it achieved while doing something positive for our school!

We continue to learn and grow and learn more about one another and ourselves!



*"Four words: SMILE Club is awesome!!*

*It's awesome because we learn all about math and science*

*We learn how to change the world and think about it in different ways!"*

*"I love being in SMILE and celebrating all of the science and math we learn together!"*

*"Ms. Moniz and Ms. Cifelli teach us about things we haven't learned or thought about before!"*

### Woonsocket Middle School

( two clubs)

Paulette Metivier  
Denise Fontaine  
Lisa Desante  
Rania Aghia

I would like to tell you what I like most about SMILE. SMILE stands for Science and Mathematics Investigative Learning Experience. We recently went on a field trip to the Woonsocket Waste Water Treatment Plant. I learned that we use 7 gallons of water per minute in the shower, that's a lot of water going down the drain! Another thing we learned about is there are live organisms called ciliates, swimming and free floating, that clean the water at the Waste Water Treatment Plant. This is one of the many ways that the water gets cleaned. Another interesting fact that I learned at the plant is the water that comes through the plant takes 20 hours to go through the entire plant. We also did some measuring, we went outside and measured the field between our two schools, and there are a lot of square feet out there.

At Woonsocket Middle School, our SMILE club has 40 middle schoolers, and 4 teachers, that's a lot of science and math lovers in one room. I have only been in SMILE for a few months, but I already love the program. I also can see now that my future will involve countless hours spent on math and science, being in SMILE is the starting line in the race of life. I look forward to having a career in science or math. SMILE is changing all of its members lives for the better. These are some of the many reasons why I love SMILE.

*Elizabeth Ferrenti 6<sup>th</sup> grade Woonsocket Middle School*

I am Mouhamed Seck an 8th grader from the SMILE program at Woonsocket Middle School. I would like to tell you about how I like the program. I like how it gets me ready to go to the high school and college. Also I enjoyed the field trip to the Wastewater treatment plant. I learned a lot such as how much water people use and, it is a lot of water! It was cool learning where our waste goes after we flush it. I am happy that I am in SMILE and, I can't wait to do this again next year too.

*Mouhamed Seck 8th grader Woonsocket Middle School.*

Let me tell you why SMILE is a great program. The first thing that the SMILE club did was go to the Wastewater Treatment Plant. When the SMILE club went to the Wastewater plant we saw the process of water turning from waste to water in the Blackstone River. We learned so much from the trip like how they separate the muck and scum from the water and that after it is treated the water is healthy for ducks to live in. At the Wastewater Treatment Plant SMILE members learned about the live organisms living in that water and saw different items that didn't go in the water treatment like: money and toys. The next thing is how SMILE helps you. I think that SMILE is a great club to join because we learn about different subjects, but have fun while doing it. Another reason is that if you are in SMILE you have a better chance of getting into college. To stay in the SMILE club you have to have good grades in all classes, this helps because you get better grades and pass school. I'm looking forward to the URI trip because you do a project with other SMILE members, so this way you make more friends.

*Kenneth Uribe 7th Woonsocket Middle school of Villa Nova*

## Calcutt Middle School 5th grade

Karen Cardoso  
Lee Karns

Why people at SMILE, “smile”  
by Irvin Garcia and Jose Guerra, 5th  
grade

“SMILE is very educational and fun because we do  
very exciting experiments.”

-Irvin, 5th grade

Students in SMILE favored this year Family Science Night including all of our activities. The activities we did included “Float your Boat”, “Penny Boat” and “Tree Cookies”. For “Float your Boat” we had to see how many pennies we could float on an aluminum foil boat in water. For “Penny Float” we had to see how many drops of water we could fit on a penny using a pipette. Through this activity we learned about surface tension. For our “Tree Cookie” activity, we learned that the number of rings on a tree cookie is how old that tree is. The Science Family Night was a success and we all enjoyed our time being the teachers instead of the students.



“We enjoyed Family Science Night because we thought it was fun to teach the grown-ups. It was awkward because the grown-ups usually teach us.”

-Nekeila and Valery, 5th grade

## West Warwick High School

Eugene Gallo  
Nelson DaSilva

So far this year our group has delved into various activities to not only prepare for challenge weekend, family science night and for college, but we do these to also enjoy the learning of scientific relationships throughout our world. At the very beginning of the year, we began to prepare for Family Science Night. We surveyed the perimeter around our school and the general environment and surroundings. We took measurements, saw the effects of the weather on nature, and we observed the wildlife and vegetation of the area. We made maps together as a group and shared them with the public at Family Science Night.

One of our other activities of the year so far was to study varied plants and wildlife. We did this when we went on our field trip to the Roger Williams Park Botanical Center. We told about this experience in a PowerPoint presentation at family science night. The giant leaves from the Botanical Center are something that could be remembered most from there! They are almost prehistoric looking!

Right now, our SMILE group at West Warwick High School is preparing more for challenge weekend. Currently, we are experimenting with GMO and DNA related topics. Our latest experiment is called the Case of the Missing Crown. The main theme of this experiment is of course, DNA. Much like the movie and board game Clue, this experiment will have our SMILE members thinking critically in order to solve the mystery of who committed the crime from various members of the crime scene. The use of DNA for forensic identification will be in practice for us with this exciting experiment! The year for us can only get better and we can only enjoy it even more with our challenge awaiting us at URI's challenge weekend!

## CLUBS

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### West Kingston Elementary School

Deby Vannoy  
Cynthia MacNeil

By: Avery C. and Natalie D.

Over the past 4 months we have been trying to improve our school grounds. We have worked on cleaning up the outdoor classroom, making habitats for toads, constructing bird houses and overall just trying to improve our school grounds for animals, plants and people. Also, we have worked on an engineering challenge. For example, we tried to build the tallest tower that we could using teamwork. As you may know, we drew maps of the school grounds showing where the most vegetation is and where the animals are. On top of all that, we have been doing student led experiments. Of course nothing can stop the excitement from building when the Alton Jones weekend is growing nearer and nearer. In conclusion, SMILE is a great way to enjoy yourself and learn about math and science at the same time!!!



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### Woonsocket High School

Ethel Locke  
Julia Grassini

#### Woonsocket Students Participate in Research Project

Submitted by Cheyanne Nelles, Varsanna S, Ms Locke and Ms. Grassini

The Woonsocket High School Smile Club collaborated with URI's professor Dr. Rainer Lohmann of the URI Graduate School of Oceanography program in some original research about persistent organic pollutants (POPs). These are chemicals that are retained in our waters, soil and air. These chemicals last a very long time, even decades, and we still don't know what the long term health ramifications are regarding these chemicals.

Our club took samples in the inlet and outlet points of Cass Pond which was originally designed as a manmade pond to capture water run-off in the area. The day we went out to put the traps in the water it was freezing. Our hands were so cold we could barely tie the knots to secure the traps. We recorded the temperature of the air, water and found the geocordinates as well as the velocity of the current. Then we had to wait over the holiday break before we retrieved our samples and sent them back to URI.

It was another cold day when we trudged back out to Cass Pond. It had snowed over the break and there was thick ice on the pond. One of traps was easily retrievable because it was in running water but the other trap was nowhere to be seen and the ice was over 6 inches thick in this part of the pond. We chopped and chiseled over and over again until we realized that we were not going to be able to find our second trap. Sadly, we went back to school and had hot chocolate.

Now we are waiting for Challenge Weekend where we will find out the results of our samples. Will our pond contain some of these persistent chemicals? And if it so, what are the chances of them being dangerous to our health?



## Tolman High School

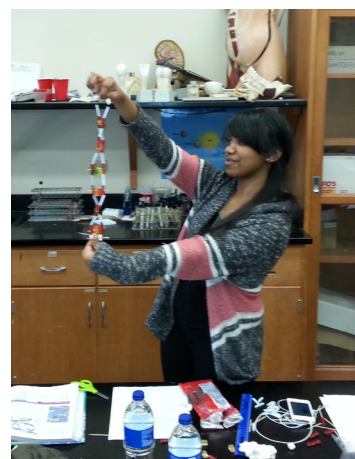
Kevin Collard  
Jason Rushton

Students in the SMILE program at Tolman high school participated in a variety of classroom and hands-on activities in both the forestry/watershed and biotechnology areas. Examples of activities:

In November, students utilized compasses, 100' tape measures, and soccer balls to gather high & low spot data and overall building dimensions for the Tolman site. Then students worked in the classroom to create a site map depicting topography. The map is useful in that it can be used to identify problem areas for runoff as well as potential ideas for stewardship projects that improve drainage and reduce runoff or increase overall site biodiversity.

In December, students learned about water sampling techniques. Students took water samples from the Blackstone River at the Slater Mill site and deployed a polyethylene passive sampler. The sampler was retrieved (2) weeks later and sent to URI along with a field blank and (2) water samples. The information was used to compare urban concentrations of POP's and PFC's along the Blackstone and other watershed areas throughout the state. PFC's and POP's are perfluorinated compounds and persistent organic pollutants. These compounds are toxic and do not degrade over time and are able to travel long distances; in addition, they bioaccumulate in the food chain.

Lastly we did a biotechnology curriculum in preparation to the Challenge Weekend. Students learned about the structure of DNA, and constructed a DNA model made out of candy. Next, students were introduced to the micropipette, an important tool for measuring very small quantities, microliters, in biotechnology. Students practiced using the pipettes, setting weights, placing new tips and ejecting old tips, and dispensing liquids in centrifuge tubes. Finally, students combined working knowledge of the pipette to dispense dyes into agarose gels and run in electrophoresis chambers. Each dye yields its own unique "fingerprint" that can be used to distinguish it from other dyes. Gel electrophoresis is a method for separation and analysis of macromolecules (DNA, RNA and proteins) and their fragments, based on their size and charge.



Students learned about the structure of DNA, and constructed a DNA model made out of candy.



At the Blackstone River, students took water samples using polyethylene passive sampler. The sampler was retrieved 2 weeks later and sent to URI Lohmann Lab. The information was used to compare urban concentrations of POP's and PFC's along the Blackstone and other watershed areas throughout the state.

## Governor Lincoln Chafee Citations

### *Schneider-Electric*

Carol Englander, SMILE Program Director, presented a citation from Governor Lincoln Chafee to Jennifer Porcelli and Jennifer Maloney commending Schneider-Electric (and APC) for its 20 years of generous support. Schneider Electric employees have mentored our SMILE students at the University of Rhode Island SMILE Annual Engineering Challenges. SMILE clubs have also taken field trips to Schneider Electric, toured the facilities, and talked with their personnel about careers. Schneider Electric through its Community ImpACT Program continues the legacy of American Power Conversion, which became the first sponsor of the Rhode Island SMILE Program in 1994.



Schneider Electric  
Jennifer Maloney Senior Human Resources, Carol Englander SMILE Director, and Jennifer Porcelli Business Development and Educational

### *Toray Plastics, America*

Carol Englander, SMILE Program Director, presented a citation from Governor Lincoln Chafee to Richard Schloesser, President and CEO of Toray Plastics (America) in Rhode Island, and Lisa Ahart, Sr. Director, US Corporate Human Resources, for its 18 years of generous support. Toray employees have mentored our SMILE students at the URI SMILE Annual Engineering Challenges. SMILE clubs have also taken field trips to Toray, toured the facilities, and talked with engineers about careers at Toray.



Toray Plastics, America  
Lisa Ahart, Sr. Director, US Corporate Human Resources, Richard Schloesser, President and CEO, and Carol Englander SMILE Director

### *Eaton Aerospace*

Carol Englander, SMILE Program Director, presented a citation from Governor Lincoln Chafee to Marvin Pelsner, Plant Manager of Eaton Aerospace in Rhode Island and Christine Long, Human Resources director, commending Eaton Aerospace for its 13 years of generous support for this after school hands-on academic program. Eaton employees have mentored our SMILE students at the URI SMILE Annual Engineering Challenges. SMILE clubs have also taken field trips to Eaton, toured the facilities, and talked with engineers about careers at Eaton.



Eaton Aerospace  
Carol Englander, SMILE Director, Christine Long, Director Human Resources and Marvin Pelsner, Plant Manager

### *Arnold Lumber*

Carol Englander, SMILE Program Director, and Assistant Director Lacey Feeley presented a citation from Governor Lincoln Chafee to Betty Arnold, Director of Finance and Administration and Lacey Feeley, SMILE Assistant Director for its 18 years of generous support for this after school hands-on academic program.



Arnold Lumber  
Carol Englander, SMILE Director, Betty Arnold, Director of Finance and Administration and Lacey Feeley, SMILE Assistant Director

### *Holiday Inn*

Carol Englander, SMILE Program Director, presented a citation from Governor Lincoln Chafee to Doug Brady, manager of the Holiday Inn, and to its staff for its 16 years of generous support.



Holiday Inn of South Kingstown  
Marie Fonesca, Sales Manager, Carol Englander SMILE Director, Doug Brady General Manager, and Staff



## CENTRAL FALLS

Ella Risk Elementary School  
Sheryl Wilson  
Peggy Boyer

Calcutt 5th grade  
Karen Cardoza  
Lee Karns

Calcutt Middle School  
Sarah Peixoto

Central Falls High School  
David Upegui  
Laura Stanish

## NORTH KINGSTOWN

N. Kingstown High School  
Karen Finlan

## PAWTUCKET

Shea High School  
Ann Marie LaRoche  
Jennifer Blanchard

Tolman High School  
Kevin Collard  
Jason Rushton

Slater Junior High School  
Michael Gavin  
John Martinelli

## SOUTH KINGSTOWN

West Kingston Elementary  
Debi Vannoy  
Cynthia MacNeil

Curtis Corner Middle School  
Gina Haberlin  
Jo Ann Basel

S. Kingstown High School  
JoAnn Basel  
Diane Wilkens

## WEST WARWICK

Horgan Elementary School  
Maria DePalma  
Amy Horne

Deering Middle School  
Eugene Gallo  
Christopher Baccei

West Warwick High School  
Eugene Gallo  
Nelson DaSilva

## WOONSOCKET

Harris Elementary School  
Heather Neil  
Stephanie Roberts

Coleman Elementary School  
Jennifer Paolozzi  
Anissa Hoard

Citizens Elementary School  
Melissa Moniz  
Jodi Cifelli

Woonsocket Middle School (2 clubs)  
Paulette Metivier  
Denise Fontaine  
Lisa Desante  
Rania Aghia

Woonsocket High School  
Julia Grassini  
Ethel Locke

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West Warwick School  
Department

Woonsocket School  
Department

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### SMILE Newsletter

#### Volume 20 No.2, April 2014

Carol Englander, Editor  
Lacey Feeley, Editor  
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Brian MacMurray, Printing Schneider Electric

*SMILE (Science and Math Investigative Learning Experiences) is an enrichment program for educationally disadvantaged students in grades 4-12 in four Rhode Island communities. SMILE's goal is to provide group activities for these students in math, science and computers. Generous gifts by participating donors make this program possible. The SMILE newsletter is published four times a year. We encourage your comments and ideas. Please share this newsletter with others who might be interested in SMILE.*

## ONLINE



[www.uri.edu/smile](http://www.uri.edu/smile)

**20<sup>th</sup>** Year of service

## Calendar

Weekly SMILE Club Meetings  
Scientific and Career Exploration Field trips

### Family Science Nights

November-December 2013

### Special Annual Events

High School  
Challenge Weekend  
March 21-22, 2014  
URI Kingston Campus

Middle School  
Engineering Challenge Weekend  
May 2-3, 2014  
URI Kingston Campus

Elementary School  
Outdoor Science Adventure  
April 11-13, 2014  
URI Alton Jones Campus

December 5, 2013	May 12, 2014	August 11-13, 2014
University of Rhode Island	University of Rhode Island	University of Rhode Island
Math and science Curriculum	Math and science Curriculum	Math and science Curriculum
Special Events Planning	Special Events Planning	Planning for the year

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