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# PACE IS...

Program for Acceleration in Careers of Engineering – Monmouth Branch

April 2002

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## Science Forum Features Diverse Projects

By **Silvano Brewster**

*Staff*

Science Forum 2002 featured several varied projects, a solar cooker, web site design, and biological research. It was one of the best Science Forums in a long time. The PACE – Monmouth Science Forum is an annual showcase of student research. The Science Forum has a long history in PACE. It started many years ago as the Science Fair. The name was changed in the mid '90s when the structure of the event was modified. Greater staff support and guidance was added.

On March 2, 2002, Markenya Brown and Gloria Manu-Anno presented their Solar Cooker project. Brandon Batista presented his research on the regenerative powers of a flatworm. Lora Austin and Charlise Celestine showed their web site design project. Monica Jackson also did a web site design project, but was not able to present it that day.

A Solar Cooker is a device for cooking food or boiling water that uses the sun as its only source of energy. Markenya Brown

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PACE staff and students pose in front of the Princeton Plasma Physics Lab.

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## PACE at Princeton Lab

By **Suky Lezeau and Brittany Leonard**

*Students*

PACE engineers of the future went to the Princeton Plasma Physics Laboratory on February 16, 2002. First on the agenda was a presentation by Dr. Jean-Marc Perelmuter. He introduced us to the structure of the Universe. We learned interesting facts about the Milky Way, such as the Milky Way is made of 200 – 300 billion stars. Also, several men contributed to the knowledge of the Universe, for example,

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*We also learned the simplest law of science, “Stuff is attracted to stuff.”*

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Edwin Hubble, Jordano Bruno, Fred Hoyle, and Albert Einstein. We also learned the simplest law of science, “stuff is attracted to stuff.”

As our journey continued, we toured the Plasma Physics Laboratory. We learned that when plasma is raised to a high temperature, in a vacuum sealed chamber, it can produce large amounts of energy. We watched a video which provided us with more information about plasma. The video

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# Unseen Dangers: Surviving Biological Terrorism

By **Brandon Batista**

*Student*

Although the prospect of a bioterrorist event brings horrible thoughts to the minds of the public, there are certain countermeasures designed to both prevent and help isolate damage caused by an attack. When deployed singly, these devices prove to be very capable of identifying agents and notifying the appropriate levels of command. The key seems to be in following the ageless axiom of teamwork over lone action. Deploying sensors in arrays increases the area of operations that is under protection of the security net, reduces the incidence of false readings to negligible percentages, and allows for an overall upgrade of both redundancy and scalability of the intelligence system.

Unfortunately, these advanced systems are often limited to military theaters, leaving civilian centers still potentially vulnerable. That is where vaccines come into play. From the time we are small children, generations of Americans have been protected against the threat of disease by vaccines, usually consisting of cells of a virus or bacteria that cause illness in humans. Common examples are the shots we receive for the measles and mumps. Older individuals may even remember the time when the country was inoculated against the contagion called smallpox. That particular program of vaccination ended general dissemination in 1972.

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## PACE – Monmouth Calendar

May 11, 2002      Graduation and Awards Banquet

July 13, 2002      Returning student applications due

### PACE IS

The PACE Is newsletter is a forum for disseminating news of interest to the PACE family and showcasing the talents and accomplishments of the PACE – Monmouth students. We solicit news, articles, essays, poems, artwork, and photography, especially from students. Please submit contributions via e-mail to [newsletter@pace-monmouth.org](mailto:newsletter@pace-monmouth.org) or by U.S. mail to PACE Is, PO Box 493, Lincroft, NJ 07738.

Back issues of PACE Is can be obtained in PDF format from the PACE – Monmouth website: [www.pace-monmouth.org](http://www.pace-monmouth.org).

## Staff Profile: Uneeda Williams



By **Silvano Brewster**

*Staff*

Uneeda Williams is a former PACE student who studied engineering and has come back to be a major contributor to the PACE program. She has been a pioneer and a leader, and is pursuing a lifelong interest in communicating with

the deaf.

Uneeda grew up in Long Branch, NJ and attended Red Bank Catholic High School. She attended PACE during all four years in high school and went on to Lafayette College to study Electrical Engineering. Her interest in engineering was sparked during the summer after eighth grade when she attended the AT&T Summer Science Program. During the two week program she built, among other things, a working alarm clock. It was at this program that she learned about PACE.

Uneeda loved PACE. For her, engineering was fun and it came easy. She came to PACE not because engineers made more money, but because she enjoyed it. She said that the AT&T program aroused her interest in engineering and PACE was the confirmation. As a student she realized what a great opportunity PACE was. She said, "I knew that people not in the PACE program wouldn't get this advanced engineering preparation and exposure and that when I went to college it would help me."

In college, Uneeda was a pioneer and a leader. She was the first black woman to graduate with a degree in Electrical Engineering from Lafayette College. She was the President of her college chapters of NSBE (National Society of Black Engineers) and was on the board of the IEEE, the Association of Black Collegians, and the Engineering Student Advisory Committee.

Since graduating from college, Uneeda worked at AT&T, then at Price Waterhouse Coopers for a year, then came back to AT&T. She has attended Steven Institute and earned a Masters degree in Information Management.

She also joined the PACE staff. She's been an instructor for Intro to Engineering and introduced the Web Design module into the course. She's helped run several programs and activities. She served one term as Co-Administrator becoming the first, and so far only, former student to do so. And, Uneeda has been one of the most popular staff members among the students.

While at Price Waterhouse Coopers, Uneeda worked with a deaf woman. The experience rekindled an interest she had since age five to learn to communicate with the deaf. She's working on a degree from Union County College: Associate of Applied Science - Interpreters for the Deaf Program. She is learning sign language and other non-verbal forms of communication, and hopes to earn a license to become a certified interpreter for the deaf ❖

*Silvano Brewster is a PACE – Monmouth staff member.*



Science Forum 2002 participants: (l-r) Markenya Brown, Charlsie Celestine, Gloria Manu-Anno, Lora Austin, Brandon Batista.



Brandon Batista presenting his research results on the planarian.

## Science Forum

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and Gloria Manu-Anno, seniors at Old Bridge High School, showed their Solar Cooker design and discussed the theory behind cooking using solar power.

Brandon Batista, a sophomore at Monmouth Regional High School, studied the planarian, a type of flatworm. He discussed the planarian's ability to regenerate itself after being cut in a variety of ways.

Lora Austin and Charlsie Celestine, juniors at Old Bridge High School, designed a web site called "Music Mania." The site featured lyrics and pictures of several artists representing several music genres. It's possible for someone with little technical knowledge to create web sites with the assistance of computer programs, but Lora and Charlsie hand wrote their web pages using HTML (Hypertext Markup Language). Thus, the project was more like a software design project.

Monica Jackson's web site, called "Monica's Poetry Page," featured pictures and poems from several well-known poets. It also contains links to their web sites. Her web site was also hand written. She was not able to present her project the day of the Science Forum, but did so later in front of an audience of staff and parents. Monica is a senior at Matawan Regional High School.

All the Science Forum participants will be presented awards at the annual PACE – Monmouth banquet on May 11, 2002. ❖

*Silvano Brewster is a PACE – Monmouth staff member and has been a member of the Science Fair/Science Forum committees for many years.*



Gloria Manu-Anno and Markenya Brown discussing their Solar Cooker, on the counter behind them.



Charlsie Celestine and Lora Austin pose in front of a projection of the home page to their web site.



Monica Jackson explains her Science Forum project, a poetry web site.



Students Working the Door at the Basketball Jamboree.

## Spring Events

### Basketball Jamboree

PACE students organized a Basketball Jamboree held on March 16, 2002. The fundraising basketball tournament netted \$125. Sylvania Harrod, Tim Lee, Brandon Batista, Gloria Manu-Anno, Charlsie Celestine, Lora Austin, and Markenya Brown organized and ran the event. Staff member Dorothy Bush provided help and guidance.

PACE student Janelle Harrell entered a female team in the tournament. Her team, called Miss Liberty, also had her sister Kyla Harrell, and friends Kyla Foster and Krysta Wiggins.

A staff team, called PACE-R-Us, played in the jamboree. On the team were staffers Mayra Caceres, Michael Chin, and Michael Sligh, and parent George Morrison. ❖

### Math Bowl Championship

The team of Jarrod Coleman, Janelle Harrell, Suky Lezeau, and Renaldo Sears won Math Bowl 2002. The Math Bowl is an annual student competition in which competing players race to answer math questions. Teams are put together on the day of the event from among the students in attendance. Four teams of four players each competed this year. The winning team, Team A, beat the team of Sylvania Harrod, Geonna Morrison, Sabrina Rencher, and Brennan Williams, Team D, in the finals.

Staff members serve as “coaches”. Coaching is a way for staff to get involved and interact with the students. They act more like cheerleaders than like coaches. Eduardo Pinzon coached the winning team. Unceda Williams coached the runners up.

Team A won \$20 Amazon.com gift certificates. ❖

### Bowlathon

The three PACE branches, PACE – Monmouth, PACE – Central Jersey, and PACE – Newark got together on March 9 for a Bowlathon at Stelton Lanes in Piscataway, NJ. About seventy-five students and staff attended the event. Brennan Williams was the Monmouth student organizer. See pictures on page 5. ❖



Winning Math Bowl Team: (l-r) Suky Lezeau, Renaldo Sears, Jr., Jarrod Coleman, Janelle Harrell.

### Puzzles

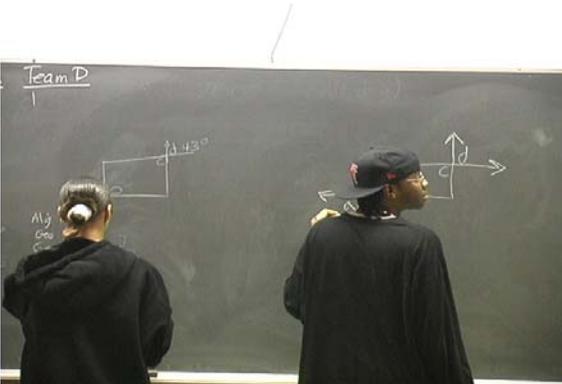
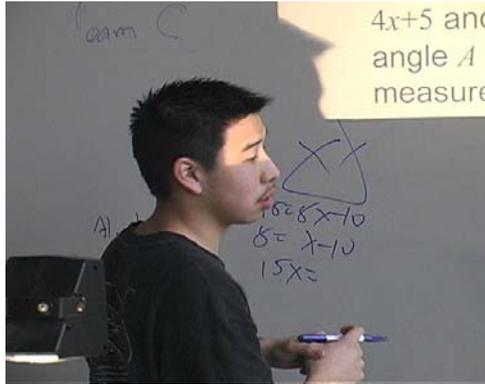
- What do the following words have in common?
  - ◆ Deft
  - ◆ First
  - ◆ Calmness
  - ◆ Canopy
  - ◆ Laughing
  - ◆ Stupid
  - ◆ Crab cake
  - ◆ Hijack
- A man is waiting in line at a hardware store to buy letters that make up the number of his house. For example - T, H, R, E, E. By chance, there were three other guys ahead of him in line all doing the same thing. The first customer buys the number one. O, N, E. He pays two bucks. The next guy buys the number TWO, and pays three bucks. The third guy buys the number ELEVEN, and he pays five bucks. Our man is buying the number TWELVE. How much does he pay?

The answers are on page 6.

### Scenes from the Bowlathon



### Scenes from the Math Bowl



## PACE at Princeton Lab

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showed that plasma can be a non polluting replacement for fossil fuels. We also learned that there are many research job opportunities in the field.

As we left, we left with knowledge of plasma and the Universe. ❖

*Suky Lezeau is a freshman at St. John Vianney High School.*

*Brittany Leonard is a freshman at Matawan Regional High School.*



PACE staff and students touring Princeton Plasma Physics Lab.



PACE students touring Princeton Forrestal Village after the Science on Saturday lecture.

### Puzzle Answers (Puzzles are on page 4.)

1. All the words contain, in a row, three consecutive letters of the alphabet.
2. Note that the letters in TWELVE are contained in TWO and ELEVEN. If he were to buy TWO and ELEVEN, he would have TWELVE, with the letters for ONE left over. Thus, the cost of TWELVE is the cost of TWO and ELEVEN ( $\$3 + \$5 = \$8$ ) minus the cost of ONE ( $\$2$ ). Therefore, it costs  $\$6$ .

## Announcements

### Brandon Batista Recognized for Math Award

PACE student Brandon Batista, a sophomore at Monmouth Regional High School, was one of five runners-up for the \$1000 National High School Calculus Student Award. Brandon won a copy of Scientific Notebook software, donated by MacKichan Software. Mike Sligh, a PACE – Monmouth calculus instructor and Math Coordinator, nominated Brandon for the award. ❖

### Student Recruitment Begins in May

New and returning student applications for the 2002 – 2003 year will be mailed out in May. Applications are also available from the PACE – Monmouth web site ([www.pace-monmouth.org](http://www.pace-monmouth.org)). Go to the Contact Us page and click on How to Apply. Returning student applications are due July 13 and new student applications are due July 20. ❖

### Spring College Tour Canceled

The annual spring tour of colleges was canceled this year. Not enough students signed up in time to support the trip. The tour was to visit colleges in Tennessee, North Carolina, Alabama, and the Atlanta area. ❖

### Staff Elections This May

Elections for the 2002 – 2003 PACE – Monmouth Governing Body are being held this May. All positions are open except for the Co-Administrator position currently held by Dr. Deborah Harrell. The Co-Administrator term is two years. All other positions are one year. ❖

### Annual Graduation and Awards Banquet

May 11 is the date for this year's Annual Graduation and Awards Banquet. This year is special because PACE celebrates its 20<sup>th</sup> year. The Keynote speaker will be the Rev. Dr. DeForest B. Soaries, Jr., a noted minister, educator, community activist and a former New Jersey Secretary of State. The banquet is being held at Branches in West Long Branch. ❖

### Our Sponsors

The PACE program would like to thank the following organizations for their support during the year:

- ◆ AT&T Foundation
- ◆ Black United Fund of New Jersey
- ◆ Brookdale Community College
- ◆ Dean's Natural Food Market
- ◆ From the Heart Workshops & Seminars
- ◆ Hewlett-Packard
- ◆ Lucent Foundation
- ◆ National Starch & Chemical Foundation
- ◆ Tyco Telecommunications

# Unseen Dangers

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Vaccines do not keep us safe forever though. Most vaccination efforts call for a supplemental dosage of vaccine every few years, depending on the contagion.

Due to ongoing and unfinalized research, society is left to rely on existing information to prevent and treat possible cases of biological contagion. To minimize the potentially deadly effects of these agents, certain protocols can often be implemented before or after an outbreak. In order to better utilize this information it is crucial to discern which agent is involved and then apply the correct measures. The following are examples of the most dreaded biological agents and their suggested treatments.

## **Anthrax**

Anthrax is caused by the bacterium *Bacillus anthracis*. Humans can be exposed to anthrax in three ways: cutaneous anthrax, acquired when a spore enters the skin through a cut or an abrasion; gastrointestinal tract anthrax, contracted from eating contaminated food, primarily meat from an animal that died of the disease; and pulmonary (inhalation) anthrax, from breathing in airborne anthrax spores. Prevention of natural cases of anthrax is based on control measures in livestock in endemic areas, such as the safe disposal of infected carcasses and vaccination of at-risk herds. Vaccination in humans should be confined to high-risk groups, such as those occupationally at risk of exposure and in some military settings. Anthrax is treatable if antibiotic therapy is initiated promptly after exposure. Cipro has proven to be the most effective among existing antibiotics in the treatment of anthrax. Studies are currently underway to develop anthrax antitoxins that could ultimately neutralize the deadly toxin responsible for the lethality of anthrax.

## **Smallpox**

Smallpox is an acute contagious disease caused by variola virus, a member of the orthopoxvirus family. Smallpox spreads directly from person to person, primarily by droplet nuclei expelled from the oropharynx of the infected person or by aerosol. Natural infection occurs following implantation of the virus on the respiratory mucosa. Contaminated clothing and bed linen can also spread the virus. An outbreak of smallpox poses difficult problems because of the virus' ability to continue to spread throughout the population unless checked by vaccination and/or quarantine of patients and their close

contacts. Because of its high fatality rates and transmissibility, smallpox now represents one of the most serious bioterrorist threats to the civilian population. Treatment of smallpox is limited to supportive therapy and antibiotics are required for treating secondary bacterial infections. There are no proven antiviral agents effective in treating smallpox. A number of compounds are presently under investigation. One of these, Cidofovir, has produced promising results in laboratory studies. The Centers for Disease Control and Prevention (CDC) has approximately 140,000 vials of smallpox vaccine in storage, each with doses for fifty through sixty people. In 2000, the CDC awarded Oravax a contract to produce additional smallpox vaccine. The first production lots are scheduled for delivery in 2004.

## **Plague**

Plague is the disease caused by the bacteria *Yersinia pestis*. Since ancient times, terrible epidemics of plague have swept through Europe, Asia, and Africa. In the 1300's, a form of bubonic plague called the Black Death annihilated a third of the population of Europe. The Black Death was named as such because it caused spots of blood to turn black under the skin. Plague is naturally transmitted to human beings by fleas from infected rats. The person affected experiences several symptoms such as chills, fever, headache, and body aches. At the same time, the lymph glands swell, particularly in the groin, armpits, and neck. Because of the high fatality rate in untreated cases and the potential for secondary outbreak, a biological attack with plague is a serious concern. An understanding of the epidemiology, clinical presentation and the recommended medical and public response following an attack could substantially decrease the morbidity and mortality rates. Injections of an existing vaccine can provide a limited resistance to the disease, and antibiotics are used to treat those exposed to plague. Research and development of a vaccine that could protect against inhalationally acquired pneumonic plague are ongoing. A number of other therapies in the treatment and prevention of plague infection have yet to be fully explored.

## **Botulism**

Botulism is caused by the bacteria *Clostridium botulinum*. These bacteria live mainly in the soil and grow only where there is no oxygen. They produce spores that can survive extremely high temperatures for many hours. These spores also live in improperly canned food. If the food lacks oxygen, the spores become active bacteria and secrete botulinus toxin

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# Unseen Dangers

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into the food. Because of modern canning methods, botulism from commercially canned food products is rare. Botulinus toxin is one of the most dangerous poisons known in science. It is absorbed by the intestine and carried to the nerves, where it can cause paralysis. Unless victims are kept breathing by artificial means, they can die of suffocation, because muscles used in breathing are paralyzed. Optimal therapy for botulism requires the prompt administration of an antitoxin in conjunction with supportive care. Supportive care for patients with botulism may include mechanical ventilators, parenteral nutrition, and treatment of secondary infections. The antitoxins cannot cure botulism after symptoms have occurred, but can lessen the severity of the illness. The standard test to detect the botulism toxin is time consuming. Future development is focused on rapid diagnosis/detection. Polymerase Chain Reaction (PCR) assays that would be able to detect the Clostridia toxin are currently under development.

In light of the current global climate and the acts of bioterrorism that occurred shortly after the September 11<sup>th</sup> terrorist attacks, the partial list of choice agents discussed that could potentially be sought by a terrorist organization may

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seem insurmountable. However, it is important to remember that the task of defending against such an insidious foe will be met by a united front including the federal government, the U.S. Military and your local community. Together, these allies in the fight against terrorism will develop and deploy the technologies needed to protect the nation. So remember, your role in this battle is to educate yourselves about biological terrorism, because knowledge is power. ❖

*Brandon Batista is a sophomore at Monmouth Regional High School.*

PACE – Monmouth P.O. Box 493 Lincroft, NJ 07738 <a href="http://www.pace-monmouth.org">www.pace-monmouth.org</a>	
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Eye Opener Coordinator	Mayra Caceres
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