

# Particle Post August 2012

*"In America, our origins matter less than our destination, and that is what democracy is all about."*

Previous issues

## Note from the Chair Thomas Roser



RHIC continues to be a major attraction for Long Island with more than 1500 visitors coming to the lab for the recent RHIC summer Sunday. A big thank you goes to everybody who volunteered to help with this important event to showcase our great facility.

The shutdown work is now underway everywhere. Big changes are happening at the downstream end of the "AGS experimental hall", building 912. What used to be the B, B', C and C' beam lines are being dismantled and decommissioned, including the old target stations. This clean-up work will make room for the relocation of the Accelerator Test Facility (ATF) from its present cramped conditions in building 820. The new ATF location is just next to the Energy Recovery Linac test facility and the two new vertical test facilities and clean room for superconducting cavity construction. After many years of planning and construction the cool down of the high current electron gun cavity in the test ERL enclosure will start soon and first beam from the gun is expected later this year.

Next to the test ERL facility the construction of new tech space has begun, which will eventually also house a new large clean room. This is now an active construction area and please respect that access is restricted to authorized personnel.

## Administration Stephanie LaMontagne-McKeon



Efforts to control cost along with the cessation of accelerator operations on June 27<sup>th</sup> and the arrival of the summer vacation season has slowed the rate of expenditure considerably. July cost for RHIC operations of \$9.5M was more than \$2M lower than the June cost of \$11.7M. Overtime was reduced by 50% and expense for consumable materials, i.e. stores withdrawals and credit card purchases was noticeably lower than in June. The Laboratory, too, has made significant contributions to support our efforts to reduce cost at RHIC. F&O has provided additional electricians at a reduced rate to support shutdown activities. Mark Toscano's Energy Management Group, also in F&O, has done an outstanding job of managing the Laboratory's power contract. In March and again in July, accumulated savings in BNL's electric power bill were distributed proportionally to internal consumers. In total, \$1.3M has been returned to C-AD bringing the effective rate for power to well below \$50 per MWH in the current year.

While DOE support in FY 2013 remains uncertain, work for others efforts continue to look promising. Discussions with NASA regarding various upgrades at NSRL are in process and the National Reconnaissance Office is considering an expanded program at NSRL next year. Additionally, Best Medical has expressed interest in increasing the scope of our current R&D efforts.

In conclusion, despite funding limitations, Run 12 was a widely acknowledged success. We have maintained a significant investment in accelerator R&D and several major upgrades are nearing completion.

## Accelerator Division Wolfram Fischer



With BLIP operation finished, all machines except the Tandem are now shut down for maintenance. The next RHIC Run will feature a long polarized proton run at 250 GeV, and possibly another mode. We are preparing a new polarized source for the run, and installing electron lenses for commissioning.

## Experimental Support & Facilities Division Phil Pile



RHIC Summer Sunday for 2012 was held on 5 August and was a great success with 1400+ visitors. We are grateful to the laboratory Community Relations staff for organizing this event as it is a great venue to talk with our friends and neighbors about our research. New this year was DOE's Dr. Tim Hallman at a booth in Berkner representing the DOE Office of Science. Many thanks to those that help prepare the RHIC facility (Ring, Cryogenics, tents etc) and the PHENIX and STAR experiments for the event and to the volunteers for the day of the event. A special thanks goes to Yousef for once again assuming the role as chief local organizer, chief troubleshooter etc.

We are now well into our summer/fall shutdown for the year and so far are on track to be ready to begin Run 13 in early January. The STAR solenoid has been successfully moved to the assembly hall (it is always a worry when we do this!) to make ready for the installation of a new beryllium beam pipe together with new detector systems - a complete Forward GEM Tracker system, half of the Muon Telescope Detector (MTD) array and at least one prototype Pixel sector for the Heavy Flavor Tracker (HFT). Both the MTD and HFT are scheduled to be complete for the 2014 run. The PHENIX experiment work for this shutdown is proceeding well with rehab of the North and South Muon Piston Calorimeters (MPC) detectors (victims of an errant beam abort) and a rework of the Vertex Trackers (VTX) and Forward Vertex Trackers (FVTX) plus other detector maintenance. More shielding for the Resistive Plate Chambers (RPC) in both the PHENIX North and South tunnels is in the planning stage so hopefully we'll plug the remainder of the soft-spots this time!

NSRL plans to begin Run12C for NASA on 1 October and run to just before Thanksgiving, The NASA run will likely be followed, after Thanksgiving, by NSRL beam operations in support of National Reconnaissance Office (NRO) experiments aimed at studying ways to improve electronics survival in space.

BLIP completed its run on 30 July and plans to start up again with RHIC this coming winter.

## Accelerator R&D Division Ilan Ben-Zvi



Present efforts on the eRHIC design development are concentrated on minimizing the cost of the first stage design. That includes an optimal choice of the design configuration, in terms of the number of linacs and recirculation passes, as well as the considerations of possible cost-efficient design options, such as the FFAG-lattice of recirculation passes and an alternative IR design. It has been also shown that the luminosity of



lower center-mass-energy collisions can be greatly improved by accommodating a space charge compensation device into the design.

Fabrication of the 704 MHz 5-cell SRF cavity (BNL3) was completed at AES, Inc. This cavity is a prototype for eRHIC and a candidate for use in CeC PoP experiment. The cavity is undergoing chemical treatment and cleaning at AES in preparation for vacuum oven bake in building 912. This will be followed by light chemical etch and particulate-free cleaning at AES and vertical testing at VTF in building 912.

The Coherent electron Cooling Proof of Principle (CeC PoP) experiment will be located in IP2 and will utilize two SRF systems: 112 MHz SRF gun and 704 MHz 5-cell cavity cryomodule. The CeC PoP layout in IP2 is almost complete and preparations for installation of various systems will begin soon. The SRF gun will produce electron bunches with up to 2 MeV energy, charge of several nC and rep rate of 78 kHz. We had a successful Critical Design Review of the 112 MHz SRF gun cryomodule, which is on order from Niowave, Inc. The 704 MHz 5-cell SRF cavity will accelerate electrons to 20 MeV. The order for the cavity and cryomodule was placed with Niowave.

The large grain SRF gun cavity, first tested in May, has been equipped with an adjustable RF power coupler and will soon be moved to Small VTF in building 912 for the second test.

A new postdoc, Binping Xiao, joined LARP group. Dr. Xiao has got his PhD from the College of William and Mary in May of 2012. He will be working with Qiong Wu on SRF crab cavity R&D for LHC Upgrade.

A prototype of the double quarter wave crab cavity (DQWCC) for LHC Upgrade was designed and is on order from Niowave.

## Operations Paul Sampson



With the great successes of Run 12 behind us, we are now in full shutdown mode. Many of the scheduled jobs for the shutdown are well underway, while others are in the initial stages.

BLIP finished its successful run running at the end of July. Following Access controls and LINAC systems checks, the tunnel was surveyed then opened to Restricted Access, leaving only the BLIP area in Controlled Access.

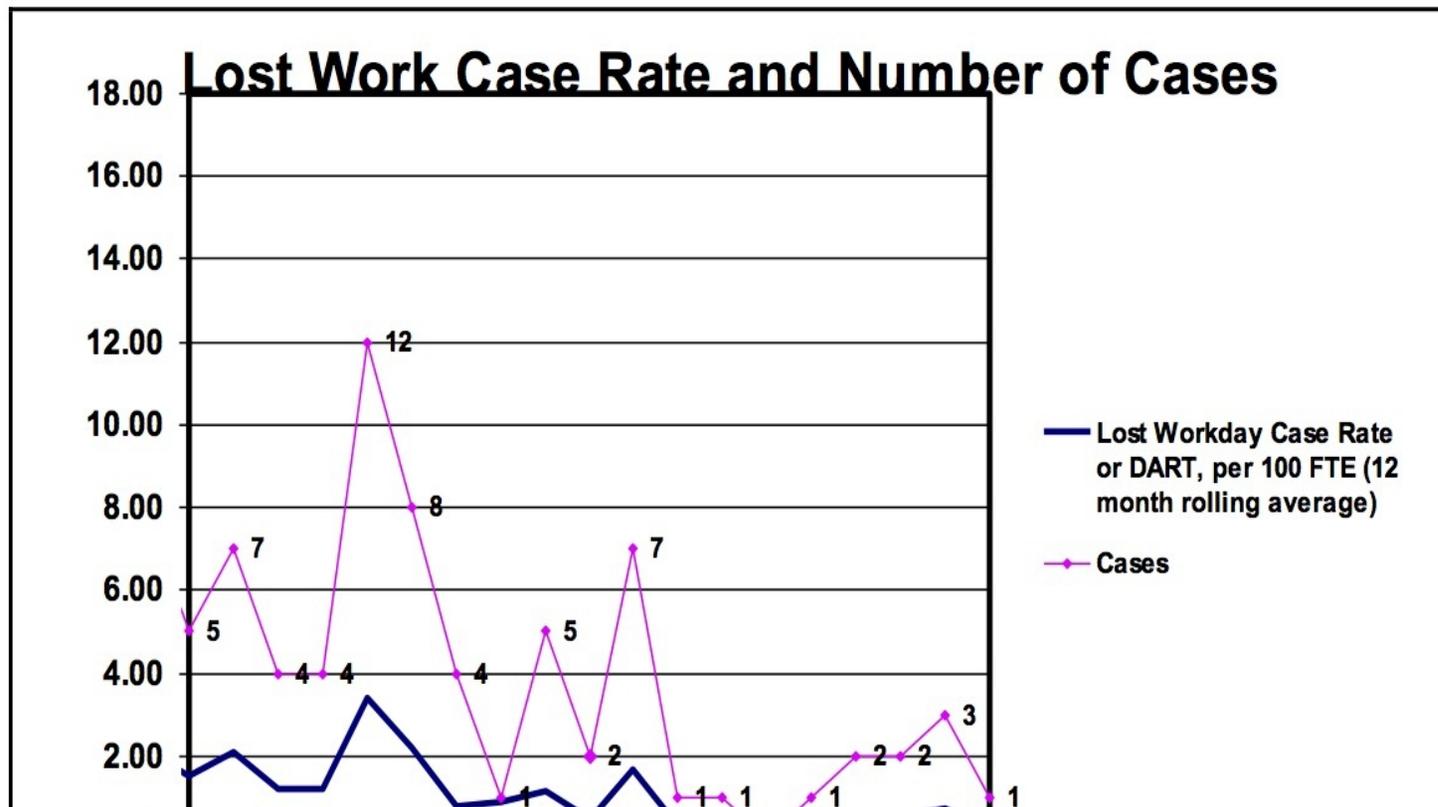
Major works that are in progress include EBIS maintenance and repair, e-

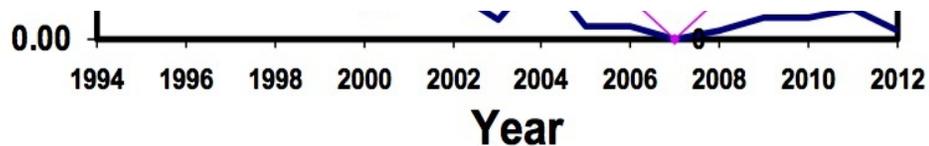
lens installation, maintenance and installation at NSRL, AGS Access Controls installation, repairs to and installation of new IPMs, BBQ system and other instrumentation and equipment in the AGS ring. Also in the AGS, a positional survey, corrector power supply tests and LLRF development are underway. In the U line, added equipment for fault protection is being added. Removal of V line transport magnets has begun.

All major systems at RHIC are undergoing seasonal maintenance, modification and upgrades. Major work on the RF system is well underway. Many other projects are in process. To view a list of the approved work for the shutdown, go the [Job Request System](#) and select "Shutdown 12". This link is behind the firewall and requires privileges to view.

For schedule updates see: [This Week](#), which can be viewed by all.

## Safety Stats





07/11 - 07/12

## C-AD Occupational Injury Statistics

For Year 2011      For Year\* 2012

<b>First Aid Cases</b>	<b>4</b>	<b>1</b>
<b>Recordable Cases</b>	<b>3</b>	<b>1</b>
<b>Lost Work Cases</b>	<b>3</b>	<b>0</b>

\* Calendar Year through 7/12

**REMINDER:** TLD exchange is done the *FIRST FRIDAY* of the Month.

**EXCHANGE DATE:** FRIDAY, September 7, 2012

*Pete Cirnigliario*



**ARRIVAL**

**Miguel Lopez joined the department on July 16 working with Mike Costanzo in the Controls Group.**

## HIGH SCHOOL ARRIVALS

**Lauren Capelluto** joined the department July 9 working with Angelika Drees in the Accelerator Physics Group.

**Jenny Chang** joined the department July 9 working with Ilan Ben-Zvi in the Accelerator R&D Division.

**Sean Dai** joined the department July 9 working with Chuyu Liu in the Instrumentation Systems Group.

**Collin Francis** joined the department July 9 working with Mike Sivertz in the NSRL Group.

**Sajid Hossain** joined the department July 9 working with Mike Sivertz/Larry Hoff in the NSRL Group.

**Greta Huang** joined the department July 9 working with Mike Sivertz in the NSRL Group.

**Andrew Kinsey** joined the department July 9 working with Omar Gould in the Linac.

**Electra Vasilopoulos** joined the department July 9 working with Nick Tsoupas in the eRHIC R&D Group.

**WELCOME!**

## LEAVE OF ABSENCE

**Prerana Kankiya**, Control Systems Group started LOA effective June 22.

## DEPARTURES

**Frederic Desforges**, Accelerator Physics Group will be leaving effective August 28.

**Laiman Kuet**, Communications and Electronic Support Group terminated effective August 10.

**Ciro Lee Sirio**, Electrical Systems Group has terminated effective July 13.

**Kazumasa Takahashi**, Preinjector Systems Group will be terminating effective August 10.

**GOOD LUCK!**



**Inside RHIC.** Please click on link to the left to view the latest web publication of Inside RHIC.



*We wish all of you born in **August**  
a happy and healthy year ahead.  
Birthday people **ONLY** click on cake*



**DID YOU KNOW**

*The  
following  
message  
is being*

***sent on  
behalf  
of  
Yousef Makdisi***

***We received  
a note  
from  
Alice  
Giordano  
that  
her father  
Sal  
(RF  
engineer  
who worked  
at  
the  
Cosmotron  
and later  
the AGS)  
died at***

**home  
Friday,  
July 27.  
The family  
will plan  
a  
Memorial  
Service  
sometime in  
mid  
August.  
Information  
will  
be  
provided  
when it  
becomes  
available. Regards,  
Yousef**

**RHIC Retreat Photo**

**How many physicists and engineers does it take to turn a computer on?**





By [Aviva Hope Rutkin](#) | August 6, 2012

## Athena Marneris Studies What Makes Glass Tubes Implode

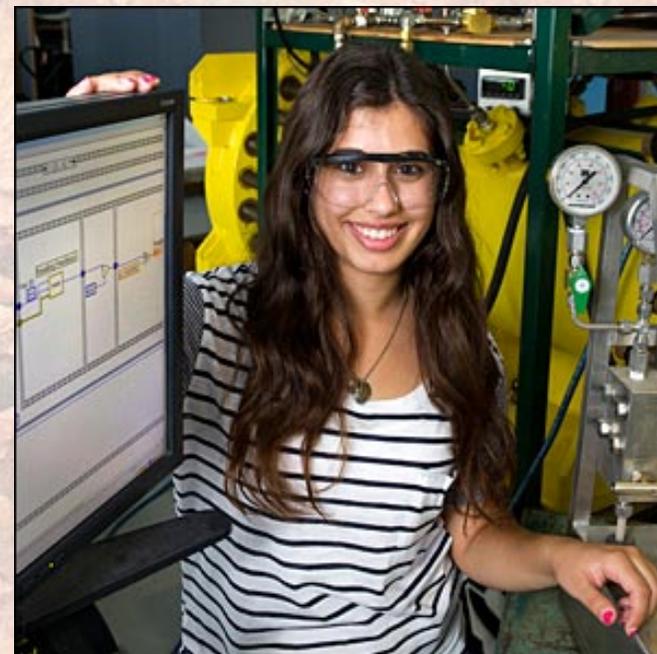
For the last year, Athena Marneris has spent her free time studying what makes glass tubes implode.

Marneris first came to Brookhaven National Laboratory (BNL) as a summer intern working for Charles Theisen in the Collider-Accelerator Department (C-AD). She used LabView, a visual programming language, to streamline the user interface of existing C-AD software. During her final poster presentation, Marneris met research engineer Rahul Sharma, who was intrigued by her work.

“We had been teaching LabView to another intern, but he had to return to school,” Sharma explains. “Athena seemed to have a good hold on the program and, after talking to her, I had the feeling she could handle a problem we were trying to solve.”

Sharma recruited Marneris to begin a new internship working with him and Milind Diwan on the [Long Baseline Neutrino Experiment](#) (LBNE). LBNE is an international high-energy physics project exploring neutrinos, the small subatomic particles that famously change “flavors” as they travel to Earth from the Sun. Despite a long and celebrated history of investigation—including Nobel Prize-winning research by [Brookhaven physicist Ray Davis](#)—neutrinos still hold many mysteries for scientists. LBNE’s goal is to learn more about these unusual particles and the role they played in the evolution of the universe.

In order to do this, LBNE plans to shoot neutrinos over an 800-mile distance underground from the Fermi National Accelerator Laboratory in Illinois to a mineshaft in South Dakota, where Davis conducted his seminal work. Brookhaven scientists are now designing a device that can detect and record the neutrinos as they arrive.



Athena Marneris

When Marneris joined the research team, they were considering using a water Cherenkov detector—a large water tank with lightbulb-like structures called photomultiplier tubes (PMTs) lining its inside walls. As neutrinos entered the detector, they would knock into water molecules, emitting a photon of light that could then be picked up by the PMTs.

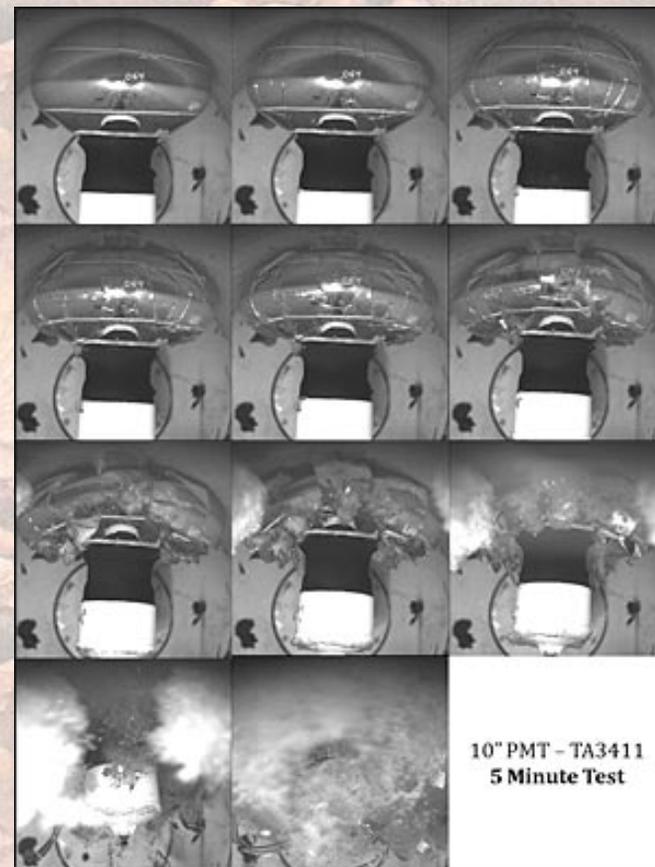
Sharma gave Marneris the task of studying PMTs in greater detail. In 2001, a similar neutrino detector in Japan ran into trouble when a single defective PMT imploded, causing a shock wave that cracked thousands of tubes nearby. LBNE scientists wanted to better understand how PMTs respond to pressure in order to prevent this kind of accident from happening with their machine.

Marneris returned to Brookhaven twice a week throughout her school year at Stony Brook University, where she studies electrical engineering and applied mathematics, to work on a computer model of the PMTs.

“The tanks had a video camera to track the photomultiplier tubes, and we would plot the pressure every second,” Marneris says. “I developed the program to test how the tubes reacted under varying pressures over time.” By subjecting different-sized PMTs to slowly rising pressure over different lengths of time, Marneris and Sharma found that PMTs were more likely to implode at lower pressures when the pressure rose at a slower rate.

Experiments with PMTs are now coming to an end. LBNE scientists are exploring a new, smaller detector design that instead uses liquid argon and an interlocking array of anodes and cathodes, which should prove less expensive than the water Cherenkov detector. However, Marneris says she’d be happy to stay on at Brookhaven if there’s more need for her help.

“I liked LabView and the programming aspect of my internship, and everyone was very accommodating with my school schedule,” she says. “It was just fun!”



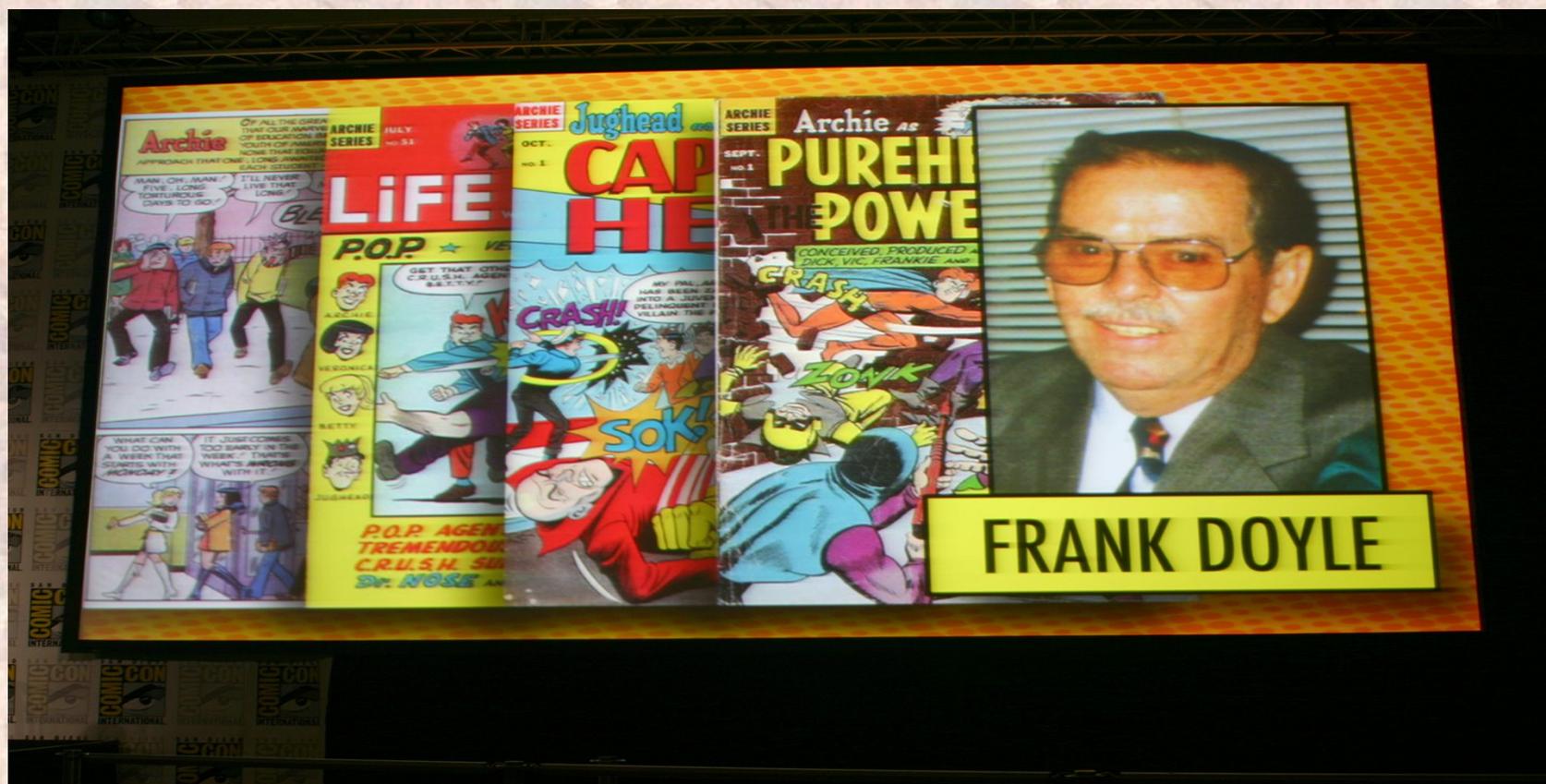
[+ ENLARGE](#)

A 10-inch photomultiplier tube implodes during a five-minute pressure point experiment.



Submitted by Kerry Mirabella

And now for something completely different - In July instead of spending my time juggling scope, spreadsheets and schedules, I visited an alternate universe known as Comic Con, or more correctly the 43rd Annual San Diego Comic-Con International. Spending 4 days of up-close and personal time with 150,000 people should be unusual enough, but throw in the fact that they ranged in age from newborn to 90 and were likely to be in costume and you've got yourself some nonstop entertainment. Events were held at the Convention Center, 2 hotels, at an enormous parking lot and in Petco Park. Petco is usually home to the San Diego Padres but instead sported a wide assortment of Zombies and hordes of humans who elected to put themselves in harm's way as part of the Walking Dead Zombie Apocalypse. It was awesome to see so many people acting like kids. Forget Disney, judging by smiles and laughter this was the happiest place on earth.



The plot thickens - My sister Claire and I went as guests of Comic-Con. We



were notified in May that our father, Frank Doyle, had been unanimously selected to receive an award; primarily for the over 10,000 stories he penned for Archie Comics Publications. The award itself is named the Bill Finger Excellence in Writing Award (Bill Finger was a co-creator of Batman). Each year, the committee selects two recipients, one living and one deceased, and we were invited to accept the award for Dad, who passed away in 1996. Because my

sister and I have also written stories for Archie Comics, we were given "Professional" badges, which gave us the superpowers of access off hours and free refreshments in the Professionals Lounge!



The Academy Awards of comic books - are called Eisners, after Will Eisner, a major contributor to



comics and graphic novels. The Eisner winners are not announced until the ceremony and because many writers and

artists are freelance most of the nominees knew each other, so the evening seemed like a

large family reunion - but with cameras, a podium and prizes. Dad's award was announced by Comics Historian/Writer Mark Evanier, who detailed Dad's career as an artist at Fiction House (where Ray Bradbury was a writer) and writer for Archie Publications, and then my sister and I went onstage to make a short speech to the ~2,000 attendees. It was such an honor to accept the award for Dad. He's the most creative person I've met so far, and aside from his work in comics Dad was a gifted painter, storyteller and prankster (anything could happen to you at our house on April Fools' Day). At the "After Party" several people came up to my sister and me and told us how much they loved Dad's stories, and that was really the best part of all.



## Fun Time

Face Memory - See how well you can do in trying to remember a random face. Addictive! Please click [here](#).



*Folks,*

*Once again, I'd like to thank everyone at C-AD for your continued support, donations and contributions that you so freely give to the Food Drive throughout the year. It means a lot to so many families.*

If everyone can bring in at least one non-perishable food item, this would help the local food pantries in our area. There are so many families who are in need of food and depend on their local food pantry to have at least one meal a day. With the food supply so low,

the volunteer's who help out at our local food pantries can't help those in need. So please.....bring whatever you can to replenish the food supply for those in need.

Your donation of any non-perishable food item can be left in the box marked "Food Drive" located in the 911A Lobby.

*Your continued support is appreciated.*

Thank you.

*Anne Marie Luhrs*

**SUMMER FUN!!** [www.bnl.gov/bera](http://www.bnl.gov/bera)

BERA has great discount tickets for SPLISH SPLASH! Stop @ the BERA store in 488, or order on line!

FREE FAMILY Swim Monday-Friday from 3:30-5pm at the BNL Pool - through August- with parent present.

FREE FAMILY FUN at the final SUMMER SUNDAY @ RHIC 8/5 this Sunday! Tours begin at 10am-3pm at Berkner 488. A great time & FREE!

FREE Family Movie night under the stars! Wed. 8/15 at 7:30pm with a Bouncy House, Popcorn, & Movie at the Rec hall, Bldg. 317 in the apt. area!

**TRIPS:** <http://www.bnl.gov/bera/recreation/events.asp>

1. NY City "do as you please" trip on sale now for next Saturday 8/11/12! \$12pp.
2. US Open TENNIS Forest Hills, NY *on sale beginning TODAY 8/3/12 Friday*

LIMITED tickets will be avail. at \$60pp for TUES 9/4 (a reg. lab workday- approved leave time required) in 313 rows T, U, V only. Tentative trip time 8:30am/7:30pm departures. The ticket, bus & driver tip will be included. <http://www.usopen.org/>

3. ~ new ~ Greenwich Village Scavenger Hunt! On sale TODAY Friday 8/3/12- trip takes place on Saturday Sept. 22 Depart Brookhaven Center at 9am, depart Greenwich Village at 5pm. Get into the nooks & crannies of The Village on this great scavenger hunt from 11am-1:30pm. Free "do as you please" time" afterwards till 5pm. Not suitable for children under 12. \$40pp adult or child. Max. 40 persons on this trip. <http://www.watsonadventures.com/public/event/the-secrets-of-greenwich-village-savenger-hunt/>

4. NASCAR Dover, DE Sunday, September 30, 2012

Join us for this exciting trip to Dover, Delaware, we have less than 40 tickets available. Party Chalet with catered food and beverages, great seats, and program

and souvenir included! The coach bus leaves Brookhaven Center at 5am and will leave Dover at 6pm. \$200 includes the luxury bus, driver tip and all the benefits of the Party Chalet. Seats TBD.

### The Well Workplace Healthletter

The August edition of the Healthletter is [now available - click here](#).

\*\*\* COMING SOON- FALL FITNESS FLYER! Get yourself PSYCHED for fall fun & fitness! \*\*\*

***The annual QOL/BERA/Recreation School Supply Drive is ON!***

Take advantage of the sales happening now & bring your *school supplies* or cash donations to Bldg. 400 lobby by badging or the

BERA Store in 488~ every little bit helps a family in need!



**ALUMNI NEWS: AGS/RHIC/C-AD RETIRED CROWD - We'd enjoy hearing from you and what you have been up to. Please send your notes to [pmanning@bnl.gov](mailto:pmanning@bnl.gov)**

**You can catch up on all of Eric Forsyth's travels by clicking on his sailing yacht below.**



# August 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2 All Employee Meeting, Berkner, 10am	3 C-AD AP Seminar, "Surface Impedance of Superconducting Radio Frequency (SRF) Materials", Binping Xiao, C-AD, 4pm, Bldg. 911B LCR	4

5 RHIC Summer Sunday	6	7 Physics Colloquium, "Photons at the LHC: from precision QCD to searches of new physics", David d'Enterria, CERN, 3:30pm, Bldg. 911B LCR	8	9	10	11
12	13	14	15	16	17 C-AD AP Seminar, "Spin Manipulation with RF Wien filters: 1) spin rotation, 2) EDM effect", Yannis Semertzidis, Physics, 4pm, Bldg. 911B LCR	18
19	20	21	22	23	24	25
26	27	28	29	30	31	



## September 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1

2	3 Labor Day Holiday	4	5	6	7	8
9 Grandparent's Day	10	11  Patriot Day Physics Colloquium, "The superluminal neutrino hypothesis: searching for tachyons or unicorns?", Robert Ehrlich, George Mason U., 3:30pm, Bldg. 555 Hamilton	12	13	14	15
16	17 Rosh Hashanah	18	19 Brookhaven Lecture, "TBD" 4pm, Berkner	20 BWIS Colloquia Series, 4pm, Berkner	21	22 Autumn Begins
23 / 30	24	25	26 Yom Kippur	27	28	29



**We Remember  
Trade Center  
Sept. 11, 2001**

**USS New York - A ship forged from the steel of the World**

**Editor:** Pamela Manning x4072

