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Newsletter

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Visit our web site at www.nechps.org.

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Good Time Had By All

Doug LaMay

Scores of Health Physics professionals from all corners of New England gathered at the Westford Regency Inn for the NECHPS Annual Meeting on June 4th. The meeting, ably emceed by Margaret McCarthy, started with a talk by HPS President-Elect Dr. Kenneth Kase. Dr. Kase discussed the "Health Physics Society Strategic Plan and Important Initiatives". He laid out the five main facets of the Strategic Plan 2010, placing particular emphasis on bringing undergraduates into Health Physics and establishing funding sources for HP students at all levels of study. Ken also laid out the Society's initiatives, including the need for HP Professionals to stay abreast of the changing technologies and procedures in the medical field.

The morning's second talk, "Medical Effects of Radiation: Skin Dose in Radiology" was presented by Dr. John Copeland, who was delighted to be speaking right after his mentor. John gave a detailed discussion of some of his team's findings regarding skin dose received during clinical procedures, and drew the somewhat surprising conclusion that "The Matrix: Reloaded" was inferior to the first movie. No members disputed Dr. Copeland's findings, although I did hear murmurings from the audience expressing the sentiment that Keanu Reeves didn't belong in either film.

After John's talk, the gathered HPs dug into a tasty buffet lunch and dessert (mmm, chocolate cake...), then assembled for a chapter business meeting in which new directors were elected (an updated list will be posted in the first newsletter of the upcoming chapter year). Ed Maher passed the President's gavel to Margaret McCarthy, and she briefly addressed the members concerning her upcoming goals, both long and short-term. One of her pressing short-term needs is to find approximately six lineal feet of library shelf space for the archived NECHPS material in her possession. If you have any ideas for Margaret, you can contact her at mem@schoolph.umass.edu.

The business meeting was also occasion for presenting awards, including recognition of the outgoing officers as well as Shawn Reilly, the first-place grant winner from the RI Science Fair, for his project entitled "Radiating Radish Seeds". A copy of the latest edition of Dr. Jacob Shapiro's book was also presented to a lucky raffle winner.

Dr. William Irwin kicked off the afternoon talks with a presentation of his work on the "Harvard Cyclotron Laboratory Decommissioning". His presentation included a brief and very interesting history of the facility in addition to a detailed discussion of the phases of decommissioning. Dr. Irwin's biggest piece of advice (I'm paraphrasing here): "during the decommissioning process, you may be tempted to ignore MARSSIM- don't."

The day's final presentation was by Christiana Briggs, who discussed the "HDER Program". Ms. Briggs updated the members on the status of the Homeland Defense Equipment Reuse Program, and explained the opportunities for HPS members to become involved by providing technical support.

The biggest surprise of the day was the appearance of a beardless Rusty Lorenzen. There was much speculation that despite official explanations to the contrary, the facial hair was more likely lost in a bet during a golf match...

Thanks again to those who attended and to our affiliate members for their continued support. From many of the 80+ people in attendance, I heard that a good time was had by all.

Membership Dues

Members are reminded that you should pay your dues *as soon as possible* to ensure that your membership status remains in good standing.

Dues are $10.00 per year, however, a payment of $40.00 will earn you 5 years of Chapter membership.

View the NECHPS History

The NECHPS web site (www.nechps.org) now has a section about chapter Meeting History, as well as a listing of the previous members of the Board of Directors, and the previous Officers (great for documenting CEUs!).

Nuclear Trip: A Tour of the MIT Reactor

Ms. Annalee Newitz

[*Ms. Newitz toured the MIT Reactor on April 2nd, 2003, and related her experience on AlterNet.org. This article is reprinted with her permission. It should serve nicely as some light Summer reading.*]

It's always fun to visit a nuclear reactor. They're so mysterious, full of invisible, bouncy particles that could zoom painlessly through your body, boring nano-scale holes in your DNA and mutating you to death. Even though nuclear reactors can't turn into bombs, all this talk of weapons of mass destruction in the media had me kind of hankering for anything vaguely related to nukes. Luckily, the Massachusetts Institute of Technology has a nuclear reactor that's open for tours.

I picked my way along a sunny street full of melting snow crusts, trying to figure out how to reach a large, barrel-shaped building the color of pistachio ice cream. I'd been given an address, but there weren't numbers on any of the doors I passed. And the reactor itself, set back from the street behind yards of chain-link fence, didn't exactly have any welcome mats. Finally I decided to ring the bell on an unmarked, locked metal door whose window was protected by steel wire. It had that groovy nuclear "high security" look. A breezy woman in uniform let me in before I could ask if I was in the right place, but clearly I was. My colleagues had already arrived, and everybody was signing in at the front desk. I immediately felt like I was on a high school field trip, which I discovered wasn't completely off the mark: dozens of high schools send curious students to MIT's reactor every year to do experiments and learn about physics.

After an excellent introductory lecture on how chain reactions work, we were ready to head down a long corridor, past two Geiger counters and into the incongruously sea foam-colored interior of the reactor itself. To get inside, we entered a tube - also sea foam - that turned out to be an air lock. As the huge outer door shut with a hissing sound, I was suddenly reminded of a submarine ride at Disneyland.

The second door on the air lock opened, and we were inside the reactor room. A high, vaulted roof as crisscrossed by catwalks. The room was dominated by a giant concrete structure at its center whose five-foot-thick walls were wrapped around neutron-absorbing heavy water, which circulated around the core, protecting us from stray radiation. I tried to imagine what the uranium rods looked like inside, and suddenly my ears popped. "We keep air pressure lower inside the reactor area," our guide explained." That way, if there's a breach in the walls, air will flow back inside rather than out." Next to me, an unidentifiable object that looked something like a door wrapped in metal had a "radioactive" sign on it. "Do not loiter," the sign advised.

"Why do you think they painted the place this color?" my friend Lauren asked me, looking vaguely alarmed. Although the reactor had been designed in the mid 1970s, the thickly painted shades of blue and green everywhere gave the place a swinging, Kennedy-era feel. I almost expected to see sparkly foam on the ceiling. Maybe nuclear power, no matter how far we come, will always bring a retro sensibility with it.

Despite all of the "Warning! Radioactive!" signs, I felt totally secure inside the reactor. The place was a monument to safety measures: in the event of an emergency, I learned, the reactor could be shut down in a half second. I also discovered that Borax, a common household cleaner containing boron, can be used on a nuclear reactor the way sugar is in a gas tank. Boron absorbs neutrons, so if you poured a bunch of Borax on the core, you'd shut the whole thing down instantly. Comforted by that thought, we looked at a long metal chute sunk deep into the concrete around the reactor core. Students use it to do quantum particle experiments, siphoning off one neutron at a time from the core and observing its behavior.

As we walked slowly around the concrete-swaddled core, I suddenly felt a kind of giddy recklessness in the reactor room. Of course reactors cannot turn into nuclear bombs: the geometry for a bomb is totally different from the geometry for a reactor core. All the same, when I looked at the thick metal-and-treated-glass containers where researchers use robotic arms to play with radioactive stuff, I felt like I knew what had happened to all of the smart kids who blew their fingers off building rockets in their backyards.

MIT's nuclear reactor is no more dangerous than many laboratories. You can be exposed to radiation or worse in an undergraduate biology lab, and the explosion possibilities in a chem lab are nothing to sneeze at. But nuclear power has a mystique. As we left, exposing our bodies to Geiger counters en route, I thought about how generations had been raised to believe nukes were the scariest things in the world.

But they aren't. We can weaponize nature in all kinds of massively destructive ways. Nukes, I'm afraid, are just the beginning.

Neutron Capture Therapy Moves Forward

Elizabeth A. Thomson

[*This article was featured in Tech Talk, Wednesday, May 21, 2003 – Vol. 47, No. 30, and is reprinted with permission.*]

Researchers from the Beth Israel Deaconess Medical Center and MIT have begun advanced clinical trials of a cancer treatment that could selectively target malignant tissue while reducing the likelihood of injury to healthy tissue.

The trials are open to patients suffering from glioblastoma multiforme (GBM, a virulent form of brain cancer), melanoma that has spread to the central nervous system, and melanoma in the extremities.

The trials are the first to use a new MIT facility dedicated to the treatment. The facility, the only one in the United States, is considered the best of its kind in the world.

All three cancers are characterized by malignant cells that have proven difficult to eradicate with conventional forms of radiation.

"For these cancers, conventional radiation therapy or surgery is not able to destroy all the tumor cells without unacceptable damage to healthy tissues," said Professor Otto K. Harling of the Department of Nuclear Engineering. The new treatment, known as neutron capture therapy (NCT), "has the potential to destroy tumor cells while sparing adjacent healthy cells."

Patients who are candidates for NCT clinical trials may have already undergone surgery for removal of as much of the tumor as possible.

The patient is given an intravenous dose of a compound containing boron-10, known as the "capture drug." He or she is then placed on a couch for positioning in the epithermal neutron beam, which is specially designed to penetrate at least halfway into the brain to reach deep-seated tumors. A device called a patient collimator—reminiscent of the device used for dental X-rays—directs the beam toward the desired region. To be effective, the neutron beam must be very pure to deliver the maximum possible dose to the tumor.

Five years ago, the exposure period lasted a few hours. Today, irradiations can be completed in a few minutes, minimizing discomfort. Delivery of the boron compound followed by irradiation in the neutron beam is broken into two sessions, delivered on consecutive days.

Dr. Paul M. Busse of Beth Israel Deaconess and Harvard Medical School calls NCT promising. "We are encouraged by our clinical results thus far and also by those of our colleagues in Europe and Japan," he said. "The new [facility] at MIT is second to none as is the research team assembled at MIT and Harvard to do this work."

Harling directed the design and construction of the new Fission Converter Epithermal Neutron Irradiation Facility. Housed in MIT's research reactor, it replaces a facility in the same location that had been used for 15 years. Busse is director of the clinical aspects of the research. Robert G. Zamenhof (Ph.D. 1977) heads the medical physics component.

In 1999 the team concluded a Phase I clinical trial of NCT for the cancers that are the focus of the current work. Phase I trials aim to determine the safety of the technique and involve a process of gradual dose increase to determine the maximum safe dose of radiation.

One of the current trials again focuses on GBM and on melanoma in the central nervous system. This trial combines elements of both Phase I and II trials. Phase II trials are designed to determine the benefits of the experimental treatment at the dose levels established

in Phase I. A separate Phase II trial is under way for melanoma on the extremities. These trials are sponsored by the National Cancer Institute and the National Institutes of Health.

NCT involves a drug and irradiation with neutrons. It is unique because it combines a biological and physical targeting of dose. The drug, which contains boron-10, is designed to concentrate preferentially in tumor cells. The patient is then exposed to a specially designed beam of "epithermal" neutrons.

The neutrons in turn interact with the boron, which releases subatomic particles that kill the tumor cells. Because these particles travel only short distances—approximately the length of a cell—the researchers expect that they will primarily damage the tumor cells and not healthy brain cells nearby.

Harling noted that patients treated with NCT might only have to be irradiated over one or two days, as compared to the 30 days typical for conventional treatments.

MIT has conducted research on this approach to radiation therapy since the 1950s. Harling himself has been working on it since 1985.

"As I got older in my professional career, I wanted to do something that was closer to helping people," he said. "I felt I could make a contribution in this area since I've spent many years working with neutrons, so I helped put together a team, we got a hospital involved, and I'm still at it and cautiously optimistic that we will succeed in developing a better cancer therapy."

The new NCT facility was funded by the Department of Energy and MIT. Additional information on the clinical trials and research can be found at http://www.bnct.org.

Who's eligible

To participate in the cancer trials, a patient must be at least 18 years old, have been diagnosed with glioblastoma multiforme, a primary brain tumor, or metastatic melanoma in the brain; have had no radiation therapy, and be able to walk and perform basic activities of daily living. A National Cancer Institute grant covers expenses related to the treatment. For additional information, contact cancer research nurse Jody Kaplan at 617-667-4679.

What's New?

Changed jobs? Just got married? Celebrating a promotion? Drop me line and I'll let the membership know via the Newsletter!

Free Meeting!

If you've got something you'd like to submit for the NECHPS Newsletter, please pass it along. We'll accept HP news updates, editorial pieces, or just about anything of interest to the New England Health Physics community. The article featuring recent developments at the MIT Research Reactor is a perfect example of the type of submission that is of interest.

If your submission finds its way into the Newsletter, you'll earn free admission for yourself or a guest to one of the chapter meetings (excluding the Annual Meeting).

You can e-mail submissions to Doug LaMay at **dlamay@mit.edu**. WordPerfect and MS Word submissions are both acceptable. You can also fax short submissions or announcements to (617) 252-1533.

New Members

If you know anyone who wants to join NECHPS, tell him/her to visit the website (**www.nechps.org)** or contact John Sumares at 617-727-6214. Student members are always welcome, and remember, student membership is free!

New Address??

To change your address or contact information, visit the NECHPS website at **www.nechps.org**.
Keeping this information will ensure accurate entries for everyone in the NECHPS Membership Directory.

NECHPS / Rad Waste Country Club Golf Tournament

Friday, August 8th, 2003

Applehill in East Kingston, NH

The $95 fee covers golf, cart, and dinner Friday night.

Interested? Contact Ron Thurlow at (603) 773-7438.

Space is limited!