

# New England Section Newsletter

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## 2002 Fall Meeting of the New England Section of the American Physical Society and the Northeast Region of the American Association of Physics Teachers Bridgewater State College, Bridgewater, Massachusetts, October 25-26, 2002

The Fall 2002 Joint Meeting of the New England Section of the American Physical Society (NES/APS) and the Northeast Region of the American Association of Physics Teachers (enhanced NES/AAPT) will be held at Bridgewater State College on Friday and Saturday, October 25-26, 2002. \*Important note: The APS will conclude its meeting Saturday afternoon. The AAPT will continue its meeting until Sunday afternoon, October 27.\*

The meeting theme *Exploring the Physics of the Big and Small* will examine topics in atomic and astrophysics. The Friday banquet speaker will be **Neil deGrasse Tyson**, Director of the Hayden Planetarium in New York City, on *Pluto: the Dog, the Planet, the Legend*. There are more objects in the outer solar system than we knew before, and some look a lot like Pluto. Are they all or are none planets? This illustrated talk will expose scientific and sociological issues of Pluto's planethood. Viewing at BSC Observatory will follow if weather permits. The Saturday banquet speaker will be **Paul Hewitt**, author of several successful physics and physical science textbooks and the popular *Hewitt Drewit!* series in *The Physics Teacher*. Most notably, his text *Conceptual Physics*, widely used for fulfilling science requirements by liberal arts majors and featuring his clever cartoons to make points with humor, provoked debates on many campuses. Is physics the concepts or must it include math? This is the rain date for Observatory viewing.

### Friday, October 25

Registration and vendor exhibition fill the afternoon from 1 pm.

3 - 4:30 APS invited session. **Alyssa Goodman**, Harvard-Smithsonian Center for Astrophysics, *A Dynamic View of Star Formation*. **Dave Hall**,

Amherst College, *Bose Einstein Condensate*.

4:45 - 5:30 AAPT invited session. 5:30 - 6:15 Poster session and wine/cheese. 6:15 - 8:30 Banquet followed by dessert and banquet speaker. 9:00 Observatory viewing.

### **Saturday, October 26**

Registration all morning. 8:30 - 10:30 APS and AAPT contributed papers.

11 - 12:30 APS invited session. **Willie Soon**, Harvard-Smithsonian Center for Astrophysics, *Solar Variability and Climate Change: the Quest for Physical Mechanisms*. **Dave DeMille**, Yale University, *Tabletop Probes for TeV Physics: Search for the Electric Dipole Moment of the Electron*. \*Note again that the AAPT meeting continues for another 24 hours.\*

Information on the fall meeting at Bridgewater is at <http://www.bridgew.edu/physics/apsF02/> There you will find travel, lodging, registration, submission, deadline, and schedule updates and forms to assist you. The hardworking committee at the college is Professors Martina Arndt, Ed Deveney and Jeff Williams. As usual, we encourage student attendance and presentations. Any student may seek reimbursement for expenses up to \$100. It is a worthwhile weekend.

### **Spring 2002 Joint Meeting at Brandeis University, April 5-6, 2002**

The joint spring meeting at Brandeis had sessions in common as well as more specialized sessions separated into the two physics organizations. On Friday afternoon Professor Laurence Abbott (Center for Complex Systems, Brandeis) gave answers to "Do Cortical Neurons Act Like Transistors?" Professor Dorothee Kern (Biochemistry Department, Brandeis) spoke on "Enzymes and Signaling Proteins in Action Studies by Nuclear Magnetic Resonance." Professor Michael Zeilik (University of New Mexico) presented "Classroom Assessment in Physics and Astronomy: The Good, the Bad and the Tested." Professor Eric Mazur of Harvard University gave the banquet talk, accompanied by dessert, on "Stopping Time." He related personal moments in his life to the memorable timeline of physics and to the unfolding parade of events in the Universe. Eric is an admirable choice for a talk of general interest.

Among the Saturday events, which had parallel sessions of contributed papers, Tim Brennan (Woodstock High School, Vermont) told about "A Year at Fermilab and Its Effects on a Classroom." Professor Sidney Nagel (University of Chicago) gave surprising and persuasive details of dripping water in "Breaking Away, Selective Withdrawal, and Islets in the Stream." Donna Young (The Wright Center, Tufts University) gave us "Chandra and the X-Ray Universe." Other things I learned that

readers may care to know: Brandeis is the host for the annual Statistical Mechanics Meeting in October. It is open to NES members (and others) and is led by Harvey Gould of Clark University. Like all fine institutions of learning, Brandeis has wonderful galleries and museums, but Never on Shabbos. Indeed, most doors are locked in buildings that are open for meetings. Still, it was a joy to be there immersed in physics and education.

DM

### **RUNNING DOWN ENDRUN**

I am the very model of a modern chief executive.  
I manage to enhance the wealth a fellow should expect to live.  
I never built a thing nor did I something innovational.  
I took from here and gave to there and made it seem sensational.  
In matters that are marginal or even downright negative,  
In tatters is the firm for which I'm modern chief executive.

To my own welfare I devote incomparable loyalty.  
The other chief execs denote inseparable royalty.  
My lifestyle gives me airs proclaiming positively regally,  
Awarding lavish options aiming thus to give me legally.  
From sixty bucks to sixty cents on days almost consecutive,  
I didn't blink. I can't for I'm a modern chief executive.

### **HAIKUS FOR SOLEMN TERRORISTS**

An Eye For A Tooth  
I Hope They Won't Run Out  
Life's not hard enough.  
Let's all strap on explosives  
and blow ourselves up.  
I'm looking forward  
to nineteen vested virgins.  
Or is it twenty?

PDQ

I don't want to make a difference. I want to make a sum. -- Schrodinger's  
Cat

**Happy prizes and awards and unhappy passings**

These are the ones the editor knows about, and they may constitute a set of measure zero in the domain of newsworthy items. If your prize or award or passing is unnoted here, blame yourself. Or else inform me of it in prose that does not require too much editing. The following stories have been shamelessly plagiarized from other sources, usually secondary themselves. References will be given upon request.

**CCSU honors Kristine Larsen** Central Connecticut State University recognized Dr. Kristine Larsen, Associate Professor of Physics and Earth Sciences and Co-director of the Honors Program, as an extraordinary teacher, along with her colleague, sociologist John Mitrano. Celebrating outstanding teaching as the core of its mission, CCSU has honored two of its finest professors with the 2001-2002 Excellence in Teaching Award. Kristine received her Ph.D. from UConn in 1990 working with Prof. Ron Mallett. Central's President Richard Judd introduced the recipients at a ceremony in Founder's Hall and hailed "their dedication in shaping student learning by using creativity and by inspiring students through rigor and contagious enthusiasm."

"Both awardees are superbly competent and grounded in the breadth and depth of their disciplines," affirmed Dr. Christine Doyle, Chair of the Excellence in Teaching Award Committee. "Both are passionately committed to bringing their subject areas to students in the best possible way. They work consciously and reflectively at their teaching." The honor carries a \$1,000 grant to be used for professional development in the coming year. Kristine responded, "Discovery is the true scientific method. That important point and the concept of respecting students as human beings are the very heart of my philosophy of teaching." She thanked her "students who have taught me there is always something new to be learned." One thing the editor has observed over years is that she never does something worthwhile only halfway.

**Guggenheim bestows fellowship on Xinsheng Sean Ling** Sean Ling, Assistant Professor at Brown University, was named a 2002 Guggenheim Fellow. He received his Ph.D. at UConn in 1992 working with Prof. Joe Budnick. Ling will use the Fellowship in a year-long sabbatical at Harvard to work with Harvard's biophysicist Amit Meller and biologist Daniel Branton and to extend his research on nanopores. With nanopore DNA sequencing Ling seeks a way to view genetic information one molecule at a time. Standard DNA sequencing, the polymerase chain reaction, is slow. Ling hopes to improve a speedier process that may eventually help to detect viruses used in biological warfare. (The reader will see in another story in this article that threats to civilian populations are being addressed by scientists and agencies.)

A nanopore, or ion channel, is a tiny hole in a cell membrane (ten thousand times smaller than the diameter of a hair). One can measure the voltage produced by an ion passing through the hole. The larger the ion, the larger the generated resistance, helping to identify different ions. Branton has pioneered the detection of genetic information while a DNA strand is driven through a nanopore. Natural nanopores currently in use

are too long to detect detailed sequences of DNA. Ling will try to develop a shorter artificial nanopore, an instance, if it works, of science's improvement on nature for a special purpose.

The John Simon Guggenheim Foundation grants money to its fellows to allow them to pursue their own "scholarly or creative work" during a block of time free from other duties. One hundred eighty-four such fellowships were awarded this year, with fellows selected from a pool of more than 2,800 applicants, ranging from artists to political scientists to biologists. Ling also has a Salomon Award from Brown to help him get started on his new line of research.

**Gayaneth Fernando receives award from Sri Lanka** Professor Gay Fernando of UConn received a Sri Lankan Presidential Award in recognition of collaborative research carried out with the Institute of Fundamental Studies in Sri Lanka. The time period was 2000-2001, and the research project was performing Stoner-Hubbard-type calculations on Fe-N compounds. (Physical Review B 61, 375 (2000) plus papers to appear later.) A. Kovoov, Interim Director of the Institute, stressed the importance to Sri Lanka of Dr. Fernando's collaboration with scientists of that country and welcomed him on his visit of December 01/January 02 for the award ceremony. (Other stories in this article show collaborations with other countries.)

**Gerald Dunne recognized in the UK as well as in the US** Professor Gerald Dunne of UConn (who used to be from Australia) has joined the Editorial Board of the Journal of Physics A (Mathematical and General), which is published by the Institute of Physics in the United Kingdom. He was also made a Fellow of the Institute of Physics (UK). In an unrelated episode, a paper "Particle number fractionization of an atomic Fermi-Dirac gas in an optical lattice" by Dunne and Javanainen (UConn) and Janne Ruostekoski (Finland to UConn to University of Hertfordshire in the UK) was featured on the Physical Review Focus website. See "When the Atom Falls Apart" at <http://focus.aps.org/v9/st21.html>. This paper proposes that the phenomenon of fractional particle number, well known in condensed matter and particle physics, could play a role in atomic physics.

**Juha Javanainen receives Research Excellence Award** Juha Javanainen (who used to be from Finland) received a University of Connecticut Chancellor's Research Excellence Award for 2001. As one of four recipients University-wide, he was officially recognized for this honor at the May 2002 Graduate Commencement ceremony. Juha is a theorist in the field of quantum optics, whose research has significantly advanced several areas, including laser cooling, quantum jumps, cavity quantum electrodynamics, and, most recently, Bose-Einstein condensation. Winning the award is satisfying, but ultra-satisfaction will come when Finland wins the Gold in hockey or the Cup in soccer.

**William Stwalley named Board of Trustees Distinguished Professor** Five UConn professors were named to the University's highest-ranking honor, that of Board of Trustees Distinguished Professor. Among them is Bill Stwalley, Professor and Head of the Physics Department. With some 100 guests in attendance at a reception in their honor, the five were

lauded by University President Philip Austin, Chancellor John Petersen, and Roger Gelfenbien, Chairman of the Board of Trustees. Austin pointed out that the title of Distinguished Professor is reserved for those who have built their reputations and distinguished themselves at the University. (Being born great is fine, having greatness thrust upon you okay, but achieving greatness is best.)

Stwalley, who is perhaps the world's leading authority on long-range interaction of atoms, is hailed by colleagues for his strong support of the integration of the physics department's research program into undergraduate experience. In 1995 he established a National Science Foundation-funded "Research Experience for Undergraduates" summer program at UConn that continues to benefit our majors along with students from other institutions coming from around the country and abroad to participate. He has also driven a number of curricular initiatives, including a photonics minor enabling physics majors and some engineering students to prepare for careers by enhancing their educations with practical training in laser-based technologies.

**Richard Jones bonds with Armenia** Here is the situation as I see it. The collapse of the Soviet Union forced untold numbers of people to trade technical work in a repressive society for underemployment in a more open one. In effect, there were millions of cab drivers who were potential nuclear, chemical and biological guns for hire by wealthy bidders in the Middle East, Persian Gulf, Indi-Pak, and other vast overwrought or overpopulated trouble spots. This poses a top concern for global security. In response the US Civilian Research and Development Foundation has been set up. (Consult <http://www.crdf.org>.) Its purpose is to support collaborative research of US and FSU scientists and engineers.

In January 2002, Armenian physicist A. Sirunian and Prof. Rick Jones of UConn were awarded a joint grant to support a basic research project at the Yerevan Physics Institute. Yerevan is an ancient city in Armenia, for centuries a station on important trade and military routes. Dr. Sirunian is Associate Director of YerPhi, one of the top high-energy physics research laboratories of the FSU. The project is to develop and test techniques pioneered at YerPhi to measure accurately the degree of linear polarization of a high-energy beam. Besides its basic scientific merit, this will be of practical benefit to researchers in the US, who plan to exploit these techniques in the construction of a new polarized beam for the GlueX experiment at Jefferson Laboratory in Newport News, Virginia, in which Jones plays a leading role.

**The saddest news from MIT** Near the end of April of this year, MIT lost two brilliant and accomplished physicists, and numerous scientists around the world lost two former teachers and revered role models. MIT Institute Professor Emeritus Victor Weisskopf died at age 93, and MIT Professor Emeritus Felix Villars died at age 81.

In a letter to alumni and other friends of MIT, Department Head Marc Kastner reminded us that "Viki" Weisskopf, a giant of modern theoretical physics, made major contributions to the development of quantum mechanics and to theoretical nuclear and particle physics. He

was the intellectual leader of CERN in its formative years, and served as Head of the Department of Physics from 1967 to 1973. Although he worked on the Manhattan Project in World War II, he became an outspoken advocate for arms control and world peace.

Felix Villars was a member of the MIT faculty for 41 years. He had a tremendous impact on both graduate and undergraduate students, delivering lectures in nearly every subject offered by the department. This editor was particularly fond of the books by Benedek and Villars on physics with examples from biology and medicine.

DM

[We know you have a choice in newsletters, and we thank you for choosing ours.]

## HOW I WILL WIN THE NOBEL PRIZE

Nobel Award Committee  
Stockholm, Sweden

Professor Emeritus Markowitz  
Physics @ UConn, Storrs

Dear Professor Emeritus Markowitz:

You are hereby informed you are the leading candidate for the 2002 Nobel Prize in Physics. We are taking the unusual step of handing you this privileged information because this is such an unusual time. Also we wish to avoid injury to you when you receive the shock.

You don't deserve the Prize in the least. In fact we are undecided whether to make the award for Physics, Chemistry, Literature or Peace. All are equally remote from you. But we find we are unable in good conscience to award it to anyone else.

Our previous awardees have become a collection of gnawing nagging drags on us, casting doubt on the entire concept of a Prize for rational and beneficial work. Where are the reasonable and benign figures we believed we had identified?

It's true that the greatest embarrassments are in the category carelessly called Peace. Half the recipients in my memory are the most warlike beings imaginable. Apparently we donated their Prizes as soon as we learned they had agreed to end their war. (You Americans have an expression: When I stop banging my head against the wall, it feels so good.) These warriors stopped banging each other's heads against the wall and we felt so good. We would recall their Prizes if we could.

What is there to say about literature? We skipped over Tolstoy and Hardy at the beginning and have never recovered. The list of nonwinners is at least as eminent as the list of winners. We have no one who reads those foreign languages. (I'm not speaking about English.) A poet or storyteller obscure in his (her) own country is ideal for the Swedish Academy.

Let us pass over chemistry. You know nothing about it. The closest you come is mixing the baking soda into the pancake batter.

We come to physics, a true face-reddener. It seems that once someone is recognized for insight into the behavior of electrons, he feels his expertise extends to the behavior of the human species. One of the elite began pronouncements on the relative brainpower of different races. Another became a guru living on top of a mountain. More recently this one has begun promoting paranormal phenomena. I thought this was settled by Ghostbusters.

The most pervasive abuse of their Prizes is their association of themselves with the Deity. All this talk of God Particles and, if only they can detect them, they will read the mind of God. Really! (How do you put it? Give me a break!) We used to call it physical intuition or insight. Now it's a mapreading of Heaven. It's unbearable but apparently irresistible. Separating physicists from the mind of God is no easier than detaching that other Priesthood from its vow of chastity. (Well, perhaps that's not the right analogy.)

Perhaps the most outrageous behavior has been the appearance of hundreds of Nobelist signatures on petitions to governments, chiefly to the Bush Administration. These petitions were composed in Fantasyland. They beg the US government and other powers to show restraint and understanding, perhaps even faith, hope and charity, to maniacal killers emerging from lands we otherwise wouldn't pay one whit of attention to. Their prose is overwritten and underedited. Don't they have worthwhile things to do, like making major discoveries and arguing over them? And another thing: It is no accident that Alfred Nobel first manufactured explosives, thus settling disputes the old-fashioned way, before reaching for Peace.

These are all the reasons why, unworthy though you are, we are considering you for the Ultimate Prize. We feel confident that you, of all people, will not turn around and smear the egg, or perhaps it's a cake, on our face. (Your American idioms are not easy to roll off the tongue.) You may not deserve the Prize, but we certainly deserve better from our usual recipients. It's a matter of national honor.

We realize your record is spotty. You did your best work at 25, like so many scientists. But we have often thought of awarding recognition to someone several decades late, long past the time for appropriateness. In your case we are not sure we want you to talk about it in Stockholm. You may kindly thank us and then bow out gracefully, taking care not to turn your back on a reigning monarch.



Even your recent record is not spotless. It has come to our attention through one of the emails that travel around the world that you committed an egregious error in the previous newsletter. For shame. Since you are correcting the error, perhaps we will overlook it. We can't have any permanent blemishes on our Nobelists.

If it turns out we don't make the award, we hope you win something, a MacArthur perhaps. (Or is it a McDonald?) That should console you in the event.

Please destroy all evidence of this message. Regards to all your readers.

Sincerely,  
Sven Sverige  
Swedish Academy

### **Some eemails, real and imagined, to the fatally flawed editor**

This one is real. I recognized the friendly style without reading the name. "David: I just received the NES newsletter and there's an egregious error..." was her opening salvo. Of course, I wondered Which one? Egregious: blatant, flagrant, glaring, but it also smacks of grievous. Egregious error is alliterative, a gem of a phrase, like elite eight for the quarterfinalists in a tournament. But wait. Did I let five armed guys with the same name and the same face onto your plane? Did I knock down a multibillion dollar company? No, the egregious error was in the executive committee membership listing, for which I apologize.

The correction is: Bill Hersman (UNH) was Chair last time and still is, and Jeff Dunham (MC) was Vice Chair last time and still is. I immediately apologized to Bill, who graciously accepted it with consoling words. I wish all readers to know that mine was not a trivial blunder because being the Chair or other high officer is not a trivial pursuit. The people volunteer for the good of us all and take time from their other work and incur expenses as well. They deserve recognition. To the eemail author: quit bustin' out all over.

Dear DM: I'm afraid we must remove you as a consultant to our firm, formerly WorldCon, now WorldCome, a seminal company. It is a cost-saving measure. One puzzle remains, which is your bills for lunch. One is for \$15, another for \$10, for the same day. Is one correct or did you have two lunches? We can't be too careful as our lunch costs often run into the thousands. Our auditors, Arthur Andersen, would surely flag an egregious error such as double-billing. In closing, I will remind you of our new motto: vigilance will turn indigence into opulence. I'm passing this note through the bars and hope it reaches you. Sincerely,  
You Know Who

Dear DM: I'm very anxious that you get this right because you have a

record of, let's just say, e e. Our multibillion dollar corporation is renaming itself as part of a campaign of improvement. We will now be called GlobalDoublecrossing in recognition of the fact that our transactions take place equally in both directions encircling the globe. You can see why this makeover is of the greatest importance to us. We remain your loyal readers. Yadda yadda

## **New England Section Executive Committee Membership 2002**

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(Please see the Editor's apology on pg 7.)

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