Fellow Physics Educators and Members of AAPT:

Through the exciting American Association of Physics Teachers New England Section (AAPT-NES), you’ll find out about new education and physics research, professional development programs, and opportunities for collaboration. Check our new web-site at www.aapt-nes.org

People often ask me how to become a “good” physics teacher. I tell them that by attending AAPT conferences I learned all of the demos, tricks, and classroom strategies that I couldn’t learn on my own nor in a college classroom. Of course, twenty years ago, there weren’t PhysTEC programs like at Boston University. Physics training programs have come a long way. In my mid-career, this year, I am spending a sabbatical year at Tufts working in their Center for Education and Engineering Outreach. Most days consists of discussions of education research and curriculum and technology development. Other days, I travel around New England observing the classrooms of some of our best physics teachers. If you have the opportunity to sit in on other teachers classrooms, it makes you reflect on your own teaching. You can learn about some of these topics at our Spring Meeting at Thayer Academy at the end of April 27th and 28th. You can find registration information on the final page of this newsletter.

The theme of our meeting is the future of Space Science. Our Banquet speaker David Latham will be giving a great talk on the Kepler project. Our host, Don Donovan and Thayer Academy are putting together a Banquet fit for royalty; check out the menu at the end of this newsletter! The next day we have three stands of contributed oral papers including several space science talks. We are still accepting poster and oral presentations which can be submitted via the web-site.

As you walk between sessions Saturday morning you may notice scores of high school Physics Olympics students. We are running the Olympics concurrently with the New England AAPT Spring Meeting. This year events include a Fan Cart race, an Egg Drop, quiz bowls and ball dropping analysis. I hope you will take some time to observe the students competing in the Olympics!

Please consider volunteering for one of several open positions on the AAPT-NES Executive Board: Vice President, CT Representative, MA Representative, Four Year College Representative. At lunchtime, we will have an Open Membership Business meeting, where we will elect these positions. Robert Hilborn from AAPT Headquaters will also give a remote Skype welcome at this time.

After lunch we will be trying a Physics Olympics Quiz Bowl event that will include elements of a demo show. In this event, Our Section Representative, David Sturm will provide several “fill-in-the-blank” demonstrations which will be presented to our High School Olympic teams who will have the opportunity to buzz in with correct answers. At the awards ceremony we will honor the Janet Guernsy New England Physics Teacher of the Year and Physics Olympics winners.

Saturday afternoon we are running three workshops: Topics include modeling, dark matter, and black holes!

In the next several pages, in addition to the program for our Spring Meeting, you will find information on several exciting Physics Teacher training programs and summer professional development opportunities. I hope to see you in Braintree at the end of April! A more detailed version of this newsletter can be downloaded from the web-site. Many thanks to our newsletter sponsor, the Lowell Regional Physics Alliance who just celebrated their 20th anniversary!

Gary Garber, President, AAPT-NES

The Lowell Regional Physics Alliance is an academic alliance between the UML physics department and high-school science teachers throughout our region. Established in 1991 to provide support for the teachers and to share common interests. The LRPA presently reaches out to many hundreds of science teachers in the area northwest of Boston as far as Fitchburg, and north to Manchester, NH, and Kittery, ME. A steering committee comprised of physics teachers and UML physics faculty guides the program and activities of the Alliance. Four general meetings are held each year in addition to a full-day of workshop meetings in March. Attendances at the general meetings have ranged from 35 to over 100, and more than 400 high-school science teachers have attended meetings since inception.
SUMMER WORKSHOPS

Physics Modeling Workshops

Tentative Schedule  Session II: August 6-10, 2012
First Parish UU Church, Kennebunk, ME  04043

Workshop Features

- Session is limited to 12 participants.
- Intensive 40-hour/week course.
Workshop leaders: Dean Meggison, 11 years of modeling physics instruction at Kennebunk High School and University of New England. Jamie Vesenka, 11 years of modeling workshop directing experience, Professor of Physics, UNE.

Goals

1. To train teachers in the use of a model-centered, constructivist method of teaching while simultaneously improving their content knowledge in physics.
2. To provide continued professional development for experienced instructors as well as mentoring of new instructors.
3. To integrate computer courseware effectively into the physics curriculum.
4. To establish electronic support and a learning community among participants.

Workshop Details

Modeling approach to physics instruction: Kinematics and dynamics. Please discuss this in advance with the workshop director, James Vesenka. All sessions are M-F 8-5 p.m. Lodging is available for modest rates at local motels or for free with FPUU church members. Non-refundable checks made out to FPUU Kennbunk of $650. Application form and remittance information at:


Contact Information:

FPUU Kennebunk, P.O. Box 235
Kennebunk, Maine 04043

Electronic application submission: kkuu@gwi.net

Please write “Physics Modeling Workshop” on the memo line. Graduate course credit from the University of Maine extra – please note out of state tuition is at an additional premium. The school of each participant is strongly encouraged to set aside adequate No Child Left Behind (Title II) funds to support attendance, or laboratory equipment, instructional materials, and/or technology to be purchased at the discretion of the participant to implement the modeling instruction. For more information contact:

James Vesenka: jvesenka@gmail.com (cell: 207-749-7913)

New England Section Newsletter March 2012

InterLACE: Interactive Learning and Collaboration Environment

August 13-17

InterLACE seeks to design, develop, and test an innovative web-based learning environment to support high school students in carrying out collaborative inquiry-based physics lessons. The InterLACE toolkit will provide both content and features that encourage discussion, debate, self-assessment, reflection, and collective sense-making. Our goal is to minimize barriers, such as time, technology, and inexperience with technology and inquiry based instruction, to the successful implementation of collaborative inquiry-based lessons.

Classroom observations have shown us a wide variation among teachers in the use of and comfort level with inquiry methods. As a result, this workshop will focus on both the InterLACE tools and the pedagogical aspects related to inquiry-based learning. During the workshop, we will provide:

- Professional development in collaborative and inquiry-based pedagogy
- Hands-on instruction in the use of InterLACE software
- Guidance in how to develop lessons using the software

Participants will receive continuing education credits.

Please contact Ethan Danahy, (ethan.danahy@tufts.edu) or Leslie Schneider, (leslie.schneider@gmail.com) www.ceeo.tufts.edu/interlace

LEGO NXT and LabVIEW Summer Institute

July 30 – Aug 3 from 9-4 each day

The LEGO NXT and LabVIEW software are powerful and engaging tools for teaching engineering, technology, science, and math. Tufts University's CEEO Summer LEGO Engineering Institute gives teachers the background they need to make effective use of these tools in their classrooms. Through hands-on, open-ended design projects, participants will learn engineering concepts, LEGO hardware & software, and associated pedagogy/educational theory. The Institute is geared towards high school and middle school teachers. It is open to any K-12 teacher, informal education provider, volunteer, or member of industry interested in learning about LEGO Engineering.

Cost: $650

Please contact Elissa Milo (Elissa.Milto@tufts.edu) with questions.

Participants will:

- Learn about the Engineering Design Process
- Learn LEGO NXT building techniques
- Explore gearing and gear ratios
- Learn to use and program the LEGO NXT
- Understand LabVIEW for LEGO Mindstorms programming logic, control, and sensor input
- Explore the educational pedagogy and theory of using hands-on engineering projects
- Investigate how to teach other content (math, science, reading) through engineering-based projects
- Discuss and develop classroom-management strategies

Participants will leave with:

- A collection of classroom tested LEGO activities
- An introduction to LEGO related resources
- A written plan for implementation in your educational setting
- A workbook of building & programming

aapt-nes.org/spring-meeting
Teacher Training Programs

Modern Physics and Dependable Course Schedule

Highlight Bridgewater State University MAT Program

In conjunction with the opening of the new $100 million science complex at Bridgewater State University, the Department of Physics is proud to unveil a revised Master of Arts in Teaching (MAT) in physics program. This professional licensure degree fosters growth in physics, while also enhancing modern teaching techniques. As the only such program offered at a public institution in eastern Massachusetts, this program meets the needs of local physics teachers and enthusiasts.

Dr. Edward Deveney, graduate program coordinator and professor of physics, said the goal of the new MAT in physics curriculum is both to, “emphasize a rigorous study of modern physics (theory, experiment and research) and to provide teachers with a convenient and dependable course schedule.”

Courses offered during the fall and spring semesters will meet once per week in the evening while courses offered during the summer will be held in a one-week intensive format. Also noteworthy, graduate physics classes do not require prerequisites – allowing students to choose their own course sequence. This offers students a dependable schedule to plan for and complete within two years. These courses can be used not only for teachers in the MAT in physics program, but also for professional development purposes, earning PDPs for teachers.

The curriculum is designed to cater to individualized levels of ability and assessment. While students with a less extensive background in physics will find that courses emphasize new foundations and/or refinement of previous skills, recent undergraduates with a stronger physics background will explore more challenging content. There is also an opportunity for students to design and complete a thesis firmly establishing a close working connection with BSU physics faculty members.

Students will experience hands-on learning with state-of-the-art equipment used in modern physics, optics and astrophysics. Access to the new observatory is also available for teachers looking for research tools in the field of astronomy. Interested students and teachers are encouraged to schedule a tour of the new facilities.

Contact Professor Deveney at edeveney@bridgew.edu or the Department of Physics at www.bridgew.edu/physics/ to schedule your visit today.

Boston University PhysTEC Program

Boston University Department of Physics is proud to announce its recent initiatives in K-12 teacher preparation. A collaborative team from the Physics department and the School of Education received a grant as a Comprehensive Site of the Physics Teacher Education Coalition, PhysTEC. Principal investigator (PI) and Master Lecturer, Andrew Duffy will spearhead efforts to graduate an increased number of physics teachers, building upon existing collaborations between the Physics department and the School of Education.

As a key component of the efforts, Boston University Physics Department recently hired its first Teacher in Residence (TIR) Juliet Jenkins. Ms. Jenkins will spend her year at BU initiating outreach activities to promote physics teacher preparation and education. Besides her eight years of classroom experience teaching Physics at Newton South High School, Ms. Jenkins has a degree in Geo-physics from Brown University and a Masters in Education from Harvard Graduate School of Education.

Efforts in the inaugural year include initiating a new Learning Assistant program whereby undergraduates receive training in pedagogy through a School of Education course and work as additional teaching fellow in collaborative problem-solving discussions for Physics courses. Additionally, outreach efforts for faculty, grad students and undergrad majors have focused on expanding efforts in reform teaching methods. The TIR, PI and the co-PIs Professor Bennett Goldberg and Professor Peter Garik, have run a series of Faculty Teaching Luncheons, Physics Education Journal Club meetings, Undergrad Major meetings for those interested in teaching, High School Teacher Advisory Group meetings and several newly initiated courses. The courses have ranged from additional early field pre-practicums to recruit more STEM majors into teaching and a new section in the "Studio" style of our algebra-based Introductory Physics course.

For more information on any of these programs, or if you would like to be involved, please contact us! Juliet Jenkins, PhysTEC TIR juijebi@bu.edu  http://www.phystec.org/institutions/boston-u/

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Master's in teaching engineering at Tufts University

The Tufts Education department in collaboration with the Tufts Center for Engineering Education and Outreach are pleased to announce a new program to prepare middle and high school engineering teachers. Tufts has been a leader in the push to include engineering in the K-12 classroom in Massachusetts and beyond and is well-positioned to prepare teachers in an innovative, hands-on environment.

Who should apply:

- Teachers currently teaching engineering without licensure
- Current engineering professionals who may be considering a career in K-12 education
- Engineering undergraduates who are excited about engineering, yet seeking an alternative career path
- People with a passion to improve the STEM education of our students

Candidates enroll in our programs to become middle or high school teachers who understand the importance of education in preparing an active, civically-engaged citizenry and who know how to approach new ideas and challenges, such as how to implement standards-based education in an inclusive classroom. The program leading to licensure endeavor to foster democratic dialogue, vitality, and change. In this way the program reflects a vision of hope and promise for educational change in the communities with whom we place pre-service teachers to practice the skills and competencies of their prospective profession.

The Tufts MAT Program leading to licensure for middle and high school teaching is ordinarily completed within one academic year and two summer semesters, but candidates may choose to extend their studies and practicum experience for a longer period of time. The candidate typically completes 2 summer semesters and one full academic year in a thoughtful scope and sequence of academic course work and field experiences. The field experiences are the focus of the Fall and Spring semesters; courses and field experiences are closely aligned with each other and experienced mentors as well as university supervisors provide valuable feedback and expertise. The summer semesters are focused on academic work in the discipline for which licensure is sought and in foundations and history of educational theory.

To learn more about the program, please visit our website or contact Morgan Hynes at morgan.hynes@tufts.edu.
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Spring Meeting Thayer Academy

Friday Night April 27th

5:00 Registration and Poster Session – light snacks and drinks available (cash bar) (Poster abstracts on web-site)
6:00 Share a Demonstration
6:30 Banquet Dinner
7:45 Keynote Speaker: David Latham
8:30 Observatory open

David W. Latham is a Senior Astronomer at the Smithsonian Astrophysical Observatory in Cambridge. He is a co-investigator on the Kepler project.

Super Earths and Life

Transiting planets are special. The amount of light blocked by the planet as it passes in front of its host star sets the size of the planet. If an orbit can be derived from Doppler spectroscopy of the host star, the light curve also provides the orientation of the orbit, leading to the mass of the planet. The resulting density for the planet can be used to constrain models for its structure and bulk properties. Can we find rocky worlds with the right temperature for water to be liquid on the surface? NASA's Kepler mission has shown that small planets are common, but the real challenge is to measure their masses. Future space missions such as the Transiting Exoplanet Survey satellite and the James Webb Space Telescope will be able to use remote sensing to probe the atmospheres of transiting planets in a search for biomarkers that are signs of life.

Saturday April 28th

7:30 Breakfast and Registration
8:00 Contributed talks (abstracts on web-site)
9:30 Coffee Break
10:00 Invited Talks
11:45 Lunch
12:00 Open Meeting of the Membership
12:30 Remote Address by Robert Hilborn, of AAPT
1:15 Demo Show and Olympics Quiz Bowl
1:45 Awards (Physics Olympics and Janet Guernsey New England Physics Teacher of the Year Award)
2:00 Workshops
5:00 Meeting adjourns

Contributed Talks: (Tentative Schedule)

Room A
8:00 AM Elizabeth Cavicchi
Exploring Space Together – with Galileo!
Edgerton Center, MIT
8:15 Amanda Pillsbury, Madhuvanti Anantharajan, Stephen Ray, Yang Yang, Laura Scher
RECREATING EXPERIMENTS FROM HISTORY/CREATING OUR OWN KNOWLEDGE
Harvard Graduate School of Education
8:30 Amanda Pillsbury, Madhuvanti Anantharajan, , Stephen Ray, Laura Scher, Yan Yang
PARALLEL JOURNEYS: GALILEO'S DISCOVERIES AND OUR OWN
Harvard Graduate School of Education
8:45 Yan Yang
Ask a Question
Harvard Graduate School of Education
9:00 Laurence L. Gould
BUT IS IT VALID SCIENCE? — Subjecting Claims about "Global Warming" to Critical Thinking in the Classroom
University of Hartford

Room B
8:00 Christopher Pilot
Turning with Centripetal Acceleration; Examples with Ships
Maine Maritime Academy
chris.pilot@mma.edu
8:15 Michael Schaab
Building A Lateral Classroom
Maine Maritime Academy
8:30 William H. Waller
Citizen Science Earth and Space Explorations for High-School Students
Rockport Public Schools
8:45 Jim Kernohan:  Milton Academy
How a class of high school students confirmed the existence of an extrasolar planet
9:00 Gary Garber:  Boston University Academy
A Reduced Gravity Pendulum

Room C
8:00 Ed Deveney: Bridgewater State University
Bridgewater State University’s revised MAT Program
8:15 Andrew Duffy: Boston University
An Electronic Physics Textbook for the iPad
8:30 Gary Garber and Leslie Schneider: Tufts University CEEO
InterLACE: Interactive Learning and Collaboration Environment
8:45 Juliet Jenkins: Boston University Physics Department
Boston University PhysTec and Teacher in Residence Explained
9:00 Vandana Singh: Framingham State University
More than “Cool Science:” Science Fiction and Science Fact in the Classroom

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Invited Speakers

Space Astronomy in 2012
Jonathan McDowell
Harvard-Smithsonian Center for Astrophysics

The flood of new discoveries from our space telescopes continues unabated. I'll talk about the active observatories carving out different chunks of the electromagnetic spectrum, and the different kinds of astrophysics we learn from them, from Spektr-R in the radio to Fermi in the gamma-ray band. I'll go into some more detail about the Chandra observatory, whose control center is in nearby Cambridge, MA, and then preview the missions we hope will fly in the coming years, including the James Webb Space Telescope.

Broad Band, High Resolution X-Ray Spectroscopy Using Microcalorimeters
Spin-Offs from Astrophysics Research
Eric Silver
Harvard-Smithsonian Center for Astrophysics

High resolving power, a bandwidth that can span 0.1-120 keV and low internal background are the hallmarks of cryogenic X-ray microcalorimeters. Originally developed for spectroscopy of cosmic X-ray and gamma ray sources such as black holes, supernova remnants and clusters of galaxies, we are now using microcalorimeters for a wide range of scientific and industrial applications on Earth. These include fundamental physics measurements of highly charged ions produced in laboratory plasmas and heavy ion accelerators as well as industrial and medical applications where high resolution X-ray spectroscopy is important to materials and chemical analysis. I will discuss the important features of our detector technology and review some of our recent experimental results.

Lunch And Open Membership Meeting:

At Lunchtime we will be having our open membership meeting where we will give updates on future section planning, section business, and have elections for new officers. During our meeting, Robert C. Hilborn Associate Executive Officer of the American Association of Physics Teachers will give a live Skype address to our membership. At the same time, the Physics Olympics will be having a great spectator event called Junkyard Dogs where the students will be assigned to work in teams to build a surprise invention!

Demo Show and Quiz Bowl

Our section representative, David Sturm of the University of Maine will present several exciting demonstrations during the Physics Olympics Quiz Bowl finale. However, David will not explain his demonstrations. The students in the Physics Olympics will have buzzers and will attempt to be the first to explain the physics behind these great demos. See if you can guess the answers before our youngest protégés can!

Awards

We will be honoring this year’s winner of the Janet Guernsey Award for Exceptional Lifetime Achievement to Physics Teaching in New England. We will also hand out trophies to the winning teams for Physics Olympics Events.

Workshops

Modeling Applied to Problem Solving Pedagogy and Integrated Online Environment w/Daniel Seaton and David Pritchard ($5) 3 hrs

We will familiarize participants to our modeling-based approach to problem solving (MAPS) pedagogy that imparts expert-like improvement of problem solving skills in mechanics, dramatically more expert-like attitudes towards science and problem-solving, and better performance in a subsequent E&M course. This pedagogy can be introduced into existing courses without dramatic changes to the syllabus. Workshop participants will sample the various in-class teaching materials for MAPS and can log into our online introductory physics course as well (http://relate.mit.edu/physicscourse).

PTRA Dark Matter with Marti Lyons and Laura Nickerson ($15) 3 hrs

Would you like to study the evidence for dark matter yourself? Join us on a historical journey while we combine the physics of Newton with real data from galaxies, similar to the data Vera Rubin herself studied when she first found evidence for dark matter. We will do a lab that you'll get to take home, and we will walk you through the calculations. You'll also learn about resources from the Perimeter Institute.

Using cool Astronomy to teach Physics with Paola Rebusco ($5) 2hrs

Everyone agrees: black holes and exoplanets are cool! Even students who may not be excited about Physics are more open towards the mysteries of the Universe. During this workshop we will see how to relate some fundamental topics in Physics to curiosities and challenges from Astrophysics and Space Science.
Directions to Thayer Academy

Thayer Academy
745 Washington Street • Braintree MA 02184

By Car From Boston
Take Exit 17 off Route 3 South. Follow the rotary and take the first right onto Union Street toward Braintree. Go up the hill on Union Street. Follow directions from Points South.

By Car From Points South
Take Exit 17 off Route 3 North. Follow the rotary around past its first exit, past the on-ramp to Rte 3, and past the off-ramp from Rte 3. Then take a right onto Union Street toward Braintree. Go up the hill on Union Street to the second traffic light at the top of the hill. Take a right onto Washington Street and then the first left onto Hobart Avenue. The Upper School campus and parking lot will be on your immediate left. The Middle School campus and parking lot are a little farther down Hobart Avenue on your right.

By Car From Points West
From Route 93 North, take Exit 6 (the Route 37 exit). Bear right as you come off of the exit onto Granite Street so that you pass Braintree's South Shore Plaza on your left. At the third set of lights, you will arrive at Braintree's Five Corners intersection. You will see a Dunkin Donuts on your right. At the light, bear slightly to your left onto Franklin Street, keeping Bertucci's restaurant on your right. After the entrance to Braintree High School on your right, take the next left onto Lakeview Avenue. At the stop sign, you will see Thayer's playing fields and the Upper School campus straight ahead on the right. Go straight across the intersection, and bear right, keeping the playing fields on your right. Thayer Middle School will come up on your left, and a bit further down, Thayer Upper School will be on your right.

By Public Transportation
For visitors who take the MBTA or commuter rails, Thayer is a short (500 yard) walk from the Braintree stop on the Red Line up the hill from Union Street.

Hotels

Boston Marriott Quincy $140 to $180
3 miles
1000 Marriott Drive
Quincy, MA 02169
(617) 472-7095

Holiday Inn Express Hotel Braintree $145 to $160
3 miles
190 Wood Road
Braintree, MA 02184
(781) 848-1260
hiexpress.com?

Hampton Inn $126 to $150
3 miles
215 Wood Road
Braintree, MA 02184
(781) 519-9051

Candlewood Suites $85 to $120
3 miles
235 Wood Road
Braintree, MA 02184
(781) 849-7450

Friday Night Banquet Menu:
Poster Session: Spring Vegetable Crudités, Euro Cheese and Local Cured Meats, Berries
Banquet Meal: Crisp Caesar Salad topped with Parmesan crisps, pear tomato, chive pesto
Balsamic Carrot and Garlicky Broccoli

Carving Station with Black Angus Roast Beast, Free Range Turkey Breast (Lava Pesto, Hors Radish Cream, Dill Chive Sauce, Roasted Cranberry Gravy)
Mashed Potato Bar (Build Your Own) Perfect mashed with extra butter and all the cream, crisp large bacon, blue cheese, farm chives, black pepper sour cream, 4 cheese mix, raw cinnamon sugar, roasted garlic clove

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Registration Page

Name: ____________________________________________________________

Position or Title: ________________________________________________

Institution: ______________________________________________________

Address: _________________________________________________________

Phone: ____________________________ e-mail: _________________________

Workshop Registration:

- **Modeling** ($5) ______
- Dark Matter ($15) ______
- Cool Astronomy ($5) ______
- Conference Registration: $40 ______
- Friday Night Banquet: $40 ______
- **Total** ______

Subtract $10 if you are a lifetime member of NES-AAPT

Checks should be made out to Thayer Academy

Alternatively, you may call in your credit card number to Thayer Academy.

Call Don Donovan at 781-664-2216

Please mail registration form and checks should be mailed to:

**Don Donovan**

**Head, Science Department**

**Thayer Academy**

**745 Washington St.**

**Braintree, MA 02184**

*Forms must be received by April 20th*

To pay by Credit Card:

Type of Card: ____________________________

Account #: ____________________________

Name on Card: __________________________

Exp Date: ____________________________

Security Code: _________________________

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