

Summer 2011

Dear Friends of Tufts Physics & Astronomy,

This second edition of our departmental newsletter once again reports an exciting year of transitions and accomplishments. Next year promises to be equally exciting, as the department will welcome two new tenure-track faculty members, Dr. Timothy Atherton in theoretical soft condensed matter physics and Dr. Pierre-Hugues Beauchemin in experimental high energy physics. This newsletter briefly summarizes a few of this year's highlights. More information can be found on our website, <http://ase.tufts.edu/physics>.



## Our Ever-Evolving Department

### Additions



*Assistant Professor Anna Sajina* received her Ph.D. in astronomy in 2006 from the University of British Columbia, Canada and then worked as a postdoctoral research associate at Caltech and at Haverford College. Her research focuses on extragalactic astronomy with emphasis on infrared and radio observations of extreme starbursts and active galactic nuclei. She has been principal investigator on a number of successful observing programs on competitive telescopes such as the Spitzer Space telescope—one such program included the detection of water ice absorption in a galaxy observed when the Universe was only twenty percent of its current age. To date, she has twenty-seven publications in renowned journals such as the *Astrophysical Journal*, *Astronomy & Astrophysics*, and *Monthly Notices of the Royal Astronomical Society*. She is married and enjoys cooking, movies, and wine.

*David Hammer*, professor of education and physics and co-director of the Tufts Center for Engineering Education and Outreach, returns to Tufts after twelve years with the University of Maryland. His focus is on the learning and teaching of science, mainly physics, for all ages from young children to adults. He has studied students' intuitive "epistemologies" (knowledge about knowing and learning), how instructors interpret and respond to student thinking, and resource-based models of knowledge and reasoning.



## Retirements



After fifty-five years at Tufts, *Vannevar Bush Professor Jacob (Jack) Schneps* is retiring from teaching and his long-standing role as project co-director of the experimental High Energy Physics Group. Since his original appointment as assistant professor in 1956, Jack has made innumerable notable contributions to the department. Besides carrying out pioneering work in high energy physics, Jack served a pivotal nine-year term as department chair, during which he was crucial to developing the Department's graduate program, securing the Burlingame Fellowships, and establishing the Tufts Institute of Cosmology, at that time the only research center in the U.S. devoted to theoretical cosmology. Jack will continue to participate in neutrino physics research.

*Laurence (Larry) McMaster (Shop Supervisor)* retired this past December after forty-four years with Tufts University. Hired in 1965, McMaster was called upon to advise and mentor "students" who were involved in assorted ventures—undergraduates, grad students, and faculty alike. The shop was his classroom, and the door was always open. Under his steady leadership the shop evolved from a modest operation into its current state-of-the-art fabrication site. Larry's pragmatic approach to novel instrumentation was crucial to experimental research at Tufts. Larry's work and guidance rank among the terrific benefits of a Tufts education.



We wish Jack and Larry the very best.

## Promotions – We would like to congratulate....

*Professor Hugh Gallagher*, who was promoted to the position of associate professor of physics this past fall.

*Denis Dupuis*, who has been promoted to the position of shop supervisor.

## News and Events

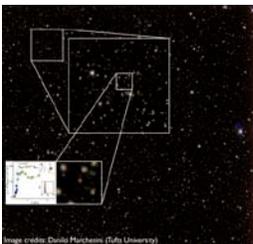
### Physicists Team with Math and Education Faculty to Launch Poincaré Institute for Mathematics Education



*Professors Roger Tobin and Hugh Gallagher* have teamed up with faculty from Tufts' School of Arts and Sciences Departments of Mathematics and Education and TERC (a nonprofit research organization) to strengthen mathematics education for middle school children in nine school districts in Massachusetts, Maine, and New Hampshire. In September 2010, through a generous \$9.5 million, five-year award from the National Science Foundation, they launched the Poincaré Institute: A Partnership for Mathematics Education. Additional information can be found at: <http://sites.tufts.edu/poincare/>

### **NOYCE/NSF Scholarship Program**

In conjunction with the Departments of Mathematics and Education in the School of Arts and Sciences at Tufts, *Associate Professor Hugh Gallagher* received a \$2.1 million grant from the Noyce/NSF Scholarship Program to support students to teach middle and high school math and science. *We are now recruiting math and science majors to receive a full scholarship to the Graduate School of Arts and Sciences Master of Arts in Teaching program*, in addition to a stipend and special mentoring while they teach in urban schools. More information about the program and the application process can be found here: <http://ase.tufts.edu/education/admissions/fundingMastersOnlyNoyce.asp>



### **New Observations of Early Galaxies Challenge Current Models**

Some of the universe's most massive galaxies may have formed billions of years earlier than current scientific models predict, according to surprising new research led by *Assistant Professor Danilo Marchesini*, in collaboration with researchers from Yale University, Carnegie Observatories, Leiden University, Princeton University, the University of Kansas, and the University of California-Santa Cruz. Findings appear in the *Astrophysical Journal* (Dec. 10, 2010),

### **“Gary-Fest: Transverse Spin Phenomena and Their Impact on QCD”— a Workshop in Honor of Gary Goldstein's Seventieth Birthday**

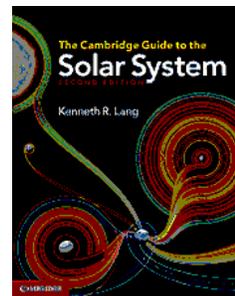
In celebration of the seventieth birthday of *Professor Gary Goldstein*, colleagues from the Thomas Jefferson National Accelerator Lab in Newport News, Virginia held a workshop/celebration in October 2010. The workshop focused on Gary's theoretical contributions to high-energy physics, particularly his work on spin-polarization. Researchers who have both been influenced by and influenced his career participated, presented papers, and paid tribute to the depth and breadth of his scientific accomplishments, including his role as an educator/mentor.

### **Time Travel and Warp Drives**

*Professor Emeritus Allen Everett* and his colleague Thomas Roman are excited to announce the release of their new book, *Time Travel and Warp Drives: A Scientific Guide to Shortcuts through Time and Space*, a “delightful discovery for any science buff...written with a light touch and an irrepressible love of the fun of sci-fi scenarios—but firmly rooted in the most up-to-date science” (University of Chicago Press).

### **The Cambridge Guide to the Solar System**

*Professor Kenneth R. Lang* is proud to announce the release of his second edition of his classic reference *The Cambridge Guide to the Solar System*. This comprehensive and updated text includes fascinating new discoveries from twelve recent solar system missions. Enhanced with hundreds of striking new images, the *Guide* is currently available via the Cambridge University Press.





### **The Society of Physics Students**

It has been a busy and productive year for our Society of Physics Students, including involvement in the faculty search process; a bowling-and-dinner evening attended by students and faculty; and several Open House events— featuring liquid nitrogen ice cream and a discussion of the physics of the movie “Avatar”— to introduce the department to prospective majors.

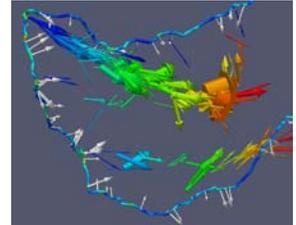
## **A Year of Distinction**

### **Faculty and Staff**

*Fiorenzo Omenetto, Professor of Biomedical Engineering and Physics*, is the recipient of the only fellowship in engineering from the John Simon Guggenheim Memorial Foundation and one of just 180 fellowships awarded to scholars, artists, and scientists chosen from approximately 3,000 applicants in the United States and Canada. Appointed on the basis of prior achievement and exceptional promise, Guggenheim Fellows, who are typically at the mid-point of their careers, have gone on to earn scores of Nobel, Pulitzer, and other prizes.

*Research Associate Professor Ken Olum* was awarded second place in this year’s Visualizing Research at Tufts Awards Program for his illustration entitled *Loop emission from a cosmic string*, which shows the shape of a cosmic string taken from a simulation, at a particular moment in time. Additional information can be viewed at:

<http://sites.tufts.edu/vrta/2011-winners/illustrations/>



### **Students**



### **Lauren Wielgus wins elite Astronaut Foundation scholarship**

*Lauren Wielgus* ('11) was chosen as this year’s Tufts honoree for the Astronaut Scholarship Foundation (ASF). The \$10,000 national scholarships are given to top engineering and science students who exhibit motivation, imagination, and exceptional performance in their field of study. This is the highest monetary award given in the United States to science and engineering students at the undergraduate level based solely on merit, and was presented to Lauren by space shuttle commander Rick Hauck, a 1962 graduate of our department.

*Ryan Hunter* ('11) was awarded the Amos Emerson Dolbear Scholarship, *Rebekah Holtz* ('11) and *Max Tolkoff* ('11) both received the N. Hobbs Knight Scholarships in Physics, *Lauren Wielgus* ('11) was awarded the Benjamin G. Brown Scholarship, and *Brendan Andrade* ('11) was awarded the Class of 1898 Prize. *Meth Bandara*, *Robert Hayes*, and *Shreya Ishita* received 2011 Howard Sample Prize Scholarships in Physics. Graduate student *Konstantinos Metallinos* was awarded the 2<sup>nd</sup> place prize in the Photo Contest for 2011.

## **Congratulations!**

The department would like to congratulate the 2011 graduates.

### **Bachelor of Science Degrees**

- **Brendan A. Andrade**, B.S., Mechanical Engineering/Physics
- **Jonathan E. Cariffo**, B.S., Mathematics/Physics
- **Adam Cohn**, B.S., Physics/Environmental Studies
- **Scott Fredrickson**, B.S., Chemical Physics
- **Emma Goldsmith-Rooney**, B.S., Physics
- **Rebekah Holtz**, B.S., Physics/Mathematics
- **Ryan D. Hunter**, B.S., Mathematics/Physics
- **David Johnson**, B.S., Physics/Philosophy
- **Scott J. Schoen Jr.**, B.S., Physics/Music
- **Max R. Tolkoff**, B.S., Physics/Mathematics
- **Lauren A. Wielgus**, B.S., Physics
- **Benjamin J. Yu**, B.S., Physics
- **Stephanie Yuen**, B.S., Physics

### **Master of Science Degrees**

- **Emily Dare**
- **Stanley A. Halka III**
- **Samuel Hamilton**
- **Eleni-Alexandra Kontou**
- **Elise Spedden**
- **Anthony Weinbeck**
- **Jeffrey Wetter**

### Doctoral Degrees

- **Daniel Cherdack**, High-Energy Physics, Advisor: W. Anthony Mann  
Thesis: *A Search for Neutrino Induced Coherent  $NC(\pi^0)$  Production in the MINOS Near Detector*
- **Matthew Hare**, High-Energy Physics, Advisor: Krzysztof Sliwa  
Thesis: *Top Mass Measurement Using the Dalitz-Goldstein Method in the Dilepton Channel*
- **Eray Sabancilar**, Cosmology, Advisor: Alexander Vilenkin  
Thesis: *Exploring Cosmic Strings: Observable Effects and Cosmological Constraints*
- **Benjamin Whitehouse**, High-Energy Physics, Advisor: Krzysztof Sliwa  
Thesis: *Measurement of the  $t\bar{t}$  Cross Section at the Run II Tevatron using Support Vector Machines*
- **Lei Yu**, Condensed Matter Physics, Advisor: Peggy Cebe  
Thesis: *Structure and Relaxation of Polymers, Polymer-Based Nanocomposites, and Biopolymers*

We are proud of your work at Tufts and look forward to the great things in your future.

Sincerely,

Roger G. Tobin  
Chair



#### Tufts Physics Tidbit

Professor Amos Dolbear, for whom the Dolbear Scholarships are named, became chair of the Tufts Department of Physics in 1874. Among other accomplishments, he invented the key technologies for the telephone more than a decade before Alexander Graham Bell, and wireless communication via radio waves well before Marconi. His attempt to challenge Bell's telephone patent was unsuccessful, but Marconi had to purchase Dolbear's patent on wireless communication in order to operate in the United States.

We welcome your news, stories, and ideas for our future newsletters. To contact us or to be added to our mailing list, please email newsletter editor: [Shannon.Landis@Tufts.edu](mailto:Shannon.Landis@Tufts.edu). We would especially like to hear from recent graduates of the program (undergraduate or graduate) about what you're doing.

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