

Boston University Physics Department

Alumni Newsletter

VOLUME 3

December 22, 2006

Message from Sid Redner

Welcome to the third issue of the Boston University Physics Department Alumni Newsletter! It's been a long time since the second issue and we hope to have more regular newsletters in the future. Much has happened in the Physics Department and at Boston University in general since the last newsletter in the summer of 2004 and we thought you would enjoy learning about these many changes. This newsletter also contains a few news items from the past year, as well as a look back at our department with a focus on our emeriti faculty. From this look at our past, we've learned that this is the 100th year of our department!

Inside This Issue

- 1 Message from Sid
- 2 Changes in University Leadership
- 2 Changes in Department Leadership
- 3 Faculty Developments
- 4 Festschrift
- 5 Departmental News
- 5 Class Notes
- 5 In Memoriam
- 6 BU History and Emeriti

Upcoming Events

- | | |
|-----------------------------|-----------|
| APS March Meeting-Denver | March 5-9 |
| BU Physics Reception at APS | March 6 |
| Dean Edmonds Colloquium | April 10 |



Changes in the University Leadership

There have been major changes in the university leadership. After one unsuccessful external search for a new university president in 2003, Dr. Aram Chobanian, the previous Provost and Dean of the Medical School was appointed President for a two-year term. Following a new external search, Dr. Robert A. Brown was named the 10th President of Boston University in the fall of 2005. Dr. Brown had a distinguished academic career at MIT, where he had been a faculty member in the Chemical Engineering department, followed by chair, and then Dean of the College of Engineering. For the past 7 years, he was Provost at MIT before he assumed the presidency here at BU. Dr. Brown has been making major positive changes around the university that should lead to exciting long-term developments for Boston University. For more information on our new university president, please go to <http://www.bu.edu/president/>

Dr. David Campbell was named as Provost of Boston University in the fall of 2005. Dr. Campbell was trained as a theoretical physicist, with research interests in non-linear phenomena and condensed matter physics. His former posts include Professor and Chair of the Department of Physics at the University of Illinois Urbana-Champaign and then Dean of the College of Engineering at Boston University from 2000. For more information about David Campbell, please go to <http://www.bu.edu/provost/meet/bio.html>

Changes in the Department

In the fall of 2004, Bennett Goldberg (PhD, Brown University) was appointed Acting Chair of the Physics Department, following the one-year term of Sid Redner that ended when he accepted the Ulam Fellowship for a one-year leave of absence at LANL (Los Alamos National Laboratory) in the fall of 2004. Bennett was then appointed as Chair in the fall of 2005. His research interests are in ultra-high resolution microscopy and spectroscopy techniques for hard and soft materials systems. He has worked in near-field imaging of photonic bandgap, ring microcavity, and single-mode waveguide devices, and has recently developed subsurface solid immersion microscopy. His group is working on novel approaches to subcellular imaging with interferometric fluorescent techniques, and in biosensor fabrication and development of waveguide evanescent bio-imaging techniques. Nano-optics research includes Raman scattering of individual nanotubes and electron systems in quantum wells and quantum dots. Bennett is also Director of Boston University's new Center for Nanoscience and Nanobiotechnology, an interdisciplinary center that brings together academic and industrial scientists, and engineers in the development of nanotechnology with applications in materials and biomedicine.



Faculty Developments

Boston University Physics has had the good fortune of making some excellent new additions to the faculty.

Anatoli Polkovnikov (PhD 2003, Yale University) joined the faculty in September 2005. He is a theoretical condensed-matter physicist who came to our department after a postdoctoral position at Harvard. His research interests include statistical mechanics of magnetic vortices in disordered superconductors, strongly correlated behavior of high-temperature superconductors, as well as problems at the interface between condensed matter, atomic physics and quantum optics. Some of his noteworthy recent contributions include understanding the dynamics of Kondo spin systems and basic features of quantum phase transitions. Dr. Polkovnikov has recently won a single investigator theory grant from AFOSR entitled, "Dynamics and Thermodynamics of Many-Particle Cold Atom Systems."



Anatoli Polkovnikov



Ami Katz

Emanuel Katz, (PhD 2001, MIT) a theoretical particle physicist, also joined the department in September 2005 and is a world leader in the development of physics beyond the Standard Model. He has been a pioneer in the development of "little Higgs" models, and in particular the "littlest Higgs" model. This popular model predicts the existence of new particles and interactions associated with the breakdown of electroweak symmetry. Ami has also been involved in the development of lattice theories of supersymmetry. He and his colleagues used recent ideas that led to the little Higgs to construct the first examples of supersymmetric lattice theories. Most recently, he applied some of the latest developments in string theory to inform the theory of the strong interaction. He has also used the idea of duality in string theory to compute the properties of sub-atomic particles held together by the strong interaction. Ami has just won an NSF CAREER award for work in "Electroweak and Strong Coupling Physics."

Ophelia Tsui (PhD 1996, Princeton University) joined the faculty in September 2006 as an Associate Professor. Prof. Tsui came to us from the Hong Kong Institute of Science and Technology. She has recently made significant advances in polymer physics, notably new measurements of spinodal decomposition that demonstrated the complex interplay between chemistry and interface and surface physics on the dynamics and equilibrium states of ultra thin films. Professor Tsui also developed approaches to study liquid crystal films by creating nanoscale patterning of surfaces that constrain and control the various phases of liquid crystals in new ways.



Ophelia Tsui



Rick Averitt

Richard Averitt (PhD 1998, Rice University) will join the faculty in January 2007. Currently he is a staff scientist at Los Alamos National Laboratory and serves as the Thrust Leader for the Complex Functional Nanomaterials group in the Center for Integrated Nanotechnologies. His research area is in Experimental Condensed Matter Physics and has focused on using ultrafast optical spectroscopy to provide unique and fundamental insights into strongly correlated electron systems. He has also been examining the applicability of his spectroscopy techniques to problems ranging from those of the semiconductor industry to biological and chemical agent threats. Rick has published more than 50 refereed publications and has active grants in several areas. His latest work is [Active terahertz metamaterial devices](#) and has been published in *Nature*, 444, p. 597, 2006 this past month together with a [comment](#).

As of January 2007, Professor Meenakshi Narain will leave our department to assume a faculty position at Brown University. We will very much miss her, especially during the current exciting build up to the opening of the LHC (Large Hadron Collider) at CERN. The next few years promise to be an exceptional period of discovery in elementary particle physics and the departmental experimentalists are all working hard to be prepared for the once-in-a-lifetime event of the commissioning of the LHC.

Lawrence R. Sulak Festschrift

On October 21 and 22, 2005, Boston University hosted "The Golden Age of Particle Physics and Its Legacy", a symposium honoring Physics Professor Larry Sulak and his contributions to physics. The event saw the largest concentration of Nobel laureates outside of Sweden with Leon Cooper, Shelly Glashow, Roy Glauber, Leon Lederman, David Lee, Carlo Rubbia, Norman Ramsey, Jack Steinberger and Frank Wilczek among those in attendance.



The two-day event consisted of presentations by collaborators of Larry, plus updates on the current and future status of the most important particle physics experiments including the LHC, the ILC, Ice-cube, and long baseline neutrino experiments, among others. More than 200 people attended a celebratory banquet held on the 22nd that was entertainingly emceed by our own Shelly Glashow. At this banquet, Bennett Goldberg announced plans for the construction of the Lawrence R. Sulak Common Room, a multifunctional space that will be used as an informal meeting place for faculty and students, for small group meetings and presentations, and a physics reading room.

You can find photos of the banquet and more details of the symposium at <http://physics.bu.edu/festschrift/>.

Departmental News

We have recently completed a major update to our departmental website <http://physics.bu.edu>. We hope that you will visit often! One of the major new features of the updated website is a section with news items for the year. Please visit http://physics.bu.edu/news_items/by_year/2006 to find out more.

Our faculty, staff, and students received many honors and awards over the past year. Some of this past year's distinctions include: Andrew Duffy received an Outstanding Teaching Award from the CAS Honors Program in recognition of his excellence in teaching the honors sections of PY 105 and PY 106. Karl Ludwig and his group were finalists in the Materials Research Society Fall 2005 Meeting "Best Poster Competition". Ed Kearns' student, John Penwell, earned First Place in the Best Poster Prize Competition at the 2005 UROP Symposium. Gene Stanley was selected for the 2005 Zenith Award of the Alzheimer' Association. Larry Sulak was awarded the Marseille Prize for Research in 2005 for the best research performed by a foreign scientist in Marseille. Christian Murphy, the BU Physics Lecture Demonstration Coordinator, won an award in the Low Cost Category of the 2006 American Association of Physics Teachers Apparatus Contest. The award is for a Soap Bubble Thin Film Viewer designed and constructed by Christian to facilitate the easy viewing of liquid thin films in lectures. Details of the apparatus can be seen at <http://physics.bu.edu/demos/Construction/BubbleViewer/>.

Shelly Glashow, the Nobel Prize winner in Physics in 1979 received the honorary degree, Laurea ad Honorem in Physics from the University of Bologna, Italy, this past October. This occasion also consisted of a workshop on "Beyond the Standard Model" that was held at the Bologna Academy of Sciences.

Class Notes

In the first issue of the graduate alumni newsletter, we had a great response to our request to provide your news items. Over 100 alumni responded and we had class notes going back to graduates from 1970. Again, we are putting out a call for your news items. Please let us know about development in your professional and personal lives that you would like to share with your fellow alumni. We'd like to help everyone keep up to date with our alumni community! To provide updates, please send an email to rlaskey@bu.edu.

In Memoriam

On a sad note, Dr. Alexandru (Alex) Marin passed away November 14, 2005 in Geneva, Switzerland after a two-week struggle against necrotizing fasciitis, a rare and rapidly progressing infection. Alex was a member of the muon detector group of the ATLAS experiment at the Large Hadron Collider. He had been playing a leading role in the installation of end-cap muon chambers at CERN in collaboration with our own Steve Ahlen and Bing Zhou from the University of Michigan.

The Physics Department has organized a fund to establish a prize in Alex Marin's name to be awarded each year for exemplary work by a graduate student in experimental high energy physics. The prize will be awarded in honor of Alex at an annual BU Physics Department Colloquium. If you would like to contribute to the fund, please visit the Alex Marin Memorial Site, replete with photos and testimonials, at <http://physics.bu.edu/pages/show/1>.



BU Physics History and Today's Emeriti

"History is easily forgotten," said emeritus professor and former physics department chair George Zimmerman, "unless it's written down." In that spirit, Zimmerman is writing a history of the BU physics department, which will celebrate its centennial anniversary in 2006.

BU was a very different university in 1906 than it is today. At the time, said Zimmerman, BU was more of a liberal arts college, with small campuses sprinkled throughout Boston. Around 1950, the university moved to its modern Charles River campus, enrollment increased drastically because of the G.I. Bill, and the university acquired the New England Aircraft School, which became the modern College of Engineering. In the late 1950s, BU physics entered a modern era of teaching and research with a rich history that can be chronicled, to some degree, through the personal histories of its staff of emeriti professors.

For emeritus professor John Stachel, who came to BU in 1964, the physics that would shape his career emerged almost at the same time as the fledgling department -- in 1905, Albert Einstein wrote his famous paper on general relativity. Stachel went on to study general relativity and became the editor of Einstein's papers. In celebration of Einstein's groundbreaking ideas, 2005 has been named the "World Year of Physics." Stachel has celebrated this year giving talks around the globe about Einstein's work.

Einstein's papers were also central to emeritus professor Abner Shimony's career. Shimony, who holds doctoral degrees in both philosophy and physics, was assigned an exercise by an early professor to figure out what was wrong with the a 1935 paper by Einstein, Podolsky and Rosen which argued that quantum mechanics is an incomplete theory. The assignment was his first introduction to the longstanding debate over the inconsistencies of quantum mechanics and special relativity. He didn't see a flaw, but became convinced that if the conclusion was false, it was due to a weak premise and not due to flawed logic. John S. Bell formalized the debate in 1964 in a theorem which derives an inequality from the assumption of "locality," the relativity principle that no causal influence can be propagated faster than light. Shimony, who joined the BU physics department in 1968, spent his first year here devising in collaboration with graduate student Michael Horne an experiment to test Bell's theorem. Years later, his experiment has shown that the data agrees with the predictions of quantum mechanics and disagree with Bell's inequality, demonstrating that quantum mechanics cannot be interpreted as a local theory.

For Bernard (Bernie) Chasan, who was formally trained as a nuclear physicist, "serendipity" led him into biophysics. Together, Schrödinger's book and his wife's work as a nurse helped him start to examine the physical questions in biology. Then, in the 1970s, Gene Stanley's group joined the BU physics department and brought with them biophysicist Ken Rothschild, who studied the proteins of the eye. Inspired and motivated, Chasan gradually moved into biophysics and also became an expert Atomic Force Microscope scientist. Chasan now employs that expertise in collaborative work on various biological investigations, including Professor Rama Bansil's study of the stomach protein mucin, and Massachusetts General Hospital urologist Horacio Cantiello's study of ion channels formed by the protein actin. Most recently Chasan designed a summer biophysics course for minority undergraduates.

Charles (Chuck) Willis joined the BU physics department in 1956 and began his research in statistical mechanics. Then, in the 1970s, Willis studied laser physics and wrote several influential articles on laser theory. After Professor Michael El-Batanouny joined the department in 1981, he and Willis worked together on several articles about the existence and properties of solitons, standing waves similar to tsunamis in the ocean, on the surface of gold.

Emeritus Professor Bill Hellman first came to BU as a post-doc in 1964, he had been trained in elementary particle physics. Most of Hellman's professional work, however, has centered on the physics of sensory perception. Hellman became involved with the Hearing Research Center in the BU Biomedical Engineering Department. Today he is collaborating with biomedical engineering professor H. Steven Colburn on papers about quantifying intuitive sensations such as loudness.

Wolf Franzen, the oldest of the physics emeriti faculty, continues his work in El-Batanouny's lab. He has collaborated with El-Batanouny for 15 years, designing instruments with his graduate students for experimental research exploring meta-stable Helium atoms, atoms excited through bombardment with beams of electrons.

When he's not penning history tomes, George Zimmerman focuses his experimental research on solving energy distribution problems using superconductors. Recently, he shipped a set of leads to the Institute for Plasma Research in India. The leads, which deliver power to equipment the same way an electric plug delivers power to a TV set, conduct very large amounts of electricity. Their capacity makes them useful for delivering power to magnets used to confine plasma in fusion reactors.

The Department has evolved and grown in many dimensions in the past half-century. What started as a small department, chaired by Robert Cohen, expanded slowly with the addition of the current emeriti by the end of the 1960s. In the 1970s, Zimmerman became chair, and scientists such as Stanley and El-Batanouny joined the staff, increasing the diversity of the Department. During the 1980s, former department chair Larry Sulak joined the Department and brought high-energy physics into the mix. At the same time, Chasan and others became interested in biophysics. Just as the work of the emeriti faculty illustrate the wide variety of places the BU Physics Department has been, their tireless curiosity foretells the exciting research that is likely to come.

Edited from article written by Elizabeth Dougherty
MSc in Science Journalism, COM '06