



Message from the Chair

Dear Alumni of the Boston University Physics Department,

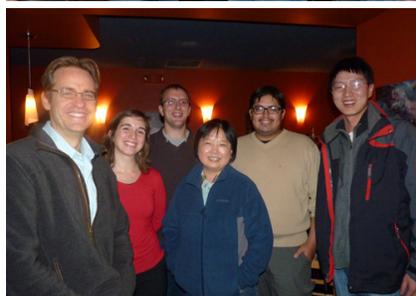
Welcome to the December 2013 issue of the BU Physics Department alumni newsletter! A lot has happened in our department since our last Alumni Reunion in October 2012, and we'd like to bring you up to date. We'd also like to take this opportunity to invite you to the next Alumni Reunion on September 19 and 20, 2014. These dates coincide with the University's Alumni Weekend, so you'll have lots of reasons to visit BU. Please save the dates!

Departmental events from the past year

In case you missed it, we hosted our sixth [Alumni Reunion](#) in September 2012. Our students and alumni made valuable connections, and we continue to develop our alumni network as a resource both to our current students and to you. You can check out the event and access alumni resources at <http://physics.bu.edu/alumni>.

In November 2012 we co-hosted our annual BU reception at the [Materials Research Society Fall Meeting](#). All alumni are invited to the reception at this year's MRS meeting on December 3rd. Please see the attached invitation.

We held our annual [Holiday Party](#) last December at The Elephant Walk in Boston. We had a great turnout, with faculty, staff and students enjoying wonderful food and drink as always. We look forward to another warm gather-

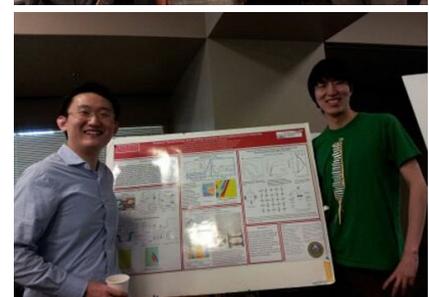


Faculty, staff and grad students mingle during the 2012 holiday party at the Elephant Walk.

ing this coming December.

During the last week of March the department held its annual [Open House](#) to recruit prospec-

tive graduate students. Thirty prospective students came to the event, where they attended presentations about research, visited



Current students share their research at the graduate open house for prospective students.

labs, and met with individual faculty and current students to learn about graduate studies at BU. In addition to the formal program, the event included a student-run poster session and informal get-togethers. It was rounded out by a festive dinner and party with students, staff and faculty at Professor Andrei Ruckenstein's house. Our recruitment efforts yielded an excellent incoming class with students from some of the best universities in the US and abroad.

In April we hosted the [33rd Annual Dean S. Edmonds, Sr. Lecture and Banquet](#). Fabiola Gianotti, a former spokesperson for the ATLAS experiment at CERN, was invited to speak about the discovery of the Higgs Boson and other recent findings from the ATLAS experiment. You might recognize



2013 Physics Convocation Ceremony at the Tsai Performance Center

Fabiola's name because she was listed by Time Magazine as one of the runner ups for Person of the Year. Before the lecture, awards were presented to three graduate students for their excellence in research and teaching. The festive banquet after the lecture was attended by about 90 guests, where we took the opportunity to review the many great departmental achievements of the past year.

We were fortunate to have held this year's physics undergraduate [Convocation Ceremony](#) at the Tsai Performance Center, which served as a lovely backdrop for this joyous occasion. Family and friends traveled from around the country to recognize the achievement of the class of 2013. Nobel Prize Laureate and Physics Professor Sheldon Glashow was this year's convocation speaker, and his speech "Physics, the best of all majors" was an entertaining narrative on the many paths a degree in physics can take you.

In September we held our annual [Department Barbeque](#) in front of Metcalf Science Center.



Faculty, staff and students enjoy good food and nice weather at the annual department barbeque.



Top: The largest pumpkin, weighing in at 83 pounds, plummets to its demise. Center: A canvas of colorful carnage. Bottom: Students gather to watch the festivities.

We had a great turnout despite the nippy weather. It was great to see our long-time Facilities Director Al Stone at the barbeque, who remains in excellent shape.

This Halloween marked the 9th year of the physics department's annual [Pumpkin Drop](#). With spooky music blaring, hot cider and candy aplenty, kooky costumes and plummeting pumpkins, it was another smash hit! To catch coverage of the event check out <http://physics.bu.edu/community/pumpkindrop>.

Higgs Discovery

In July 2012, the ATLAS and CMS experiments announced the discovery of a new elementary particle produced in proton-proton collisions at the Large Hadron Collider (LHC). Preliminary measurements indicated that this newly discovered particle was roughly consistent with the elusive and long sought after Higgs boson — an important component in the Standard Model of particle physics that describes all known elementary particles and their interactions. In the Standard Model, the Higgs boson is responsible for electroweak symmetry breaking, which separates the weak and the electromagnetic interactions in the early universe and for giving masses to the elementary particles. Since the announcement of their discovery in July, the teams have amassed and analyzed more than twice as much data, and the results thus far are in line with the predictions for a Standard Model Higgs particle. For their discovery, the ATLAS and CMS collaborations were awarded the 2013 High Energy and Particle Physics Prize by the European Physical Society for their outstanding contributions to High Energy Physics.

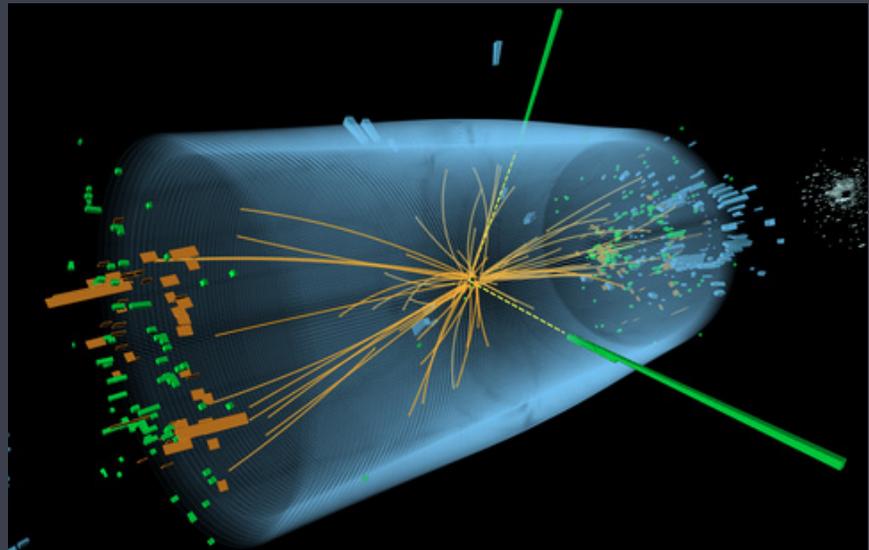
Boston University researchers have played critical roles in this discovery in both the ATLAS and CMS collaborations. The ATLAS group at BU is led by Professors Steve Ahlen, Kevin Black, and John Butler and includes Research Professors Jim Shank and Saul Youssef, along with several post-doctoral research associates, graduate students, and undergraduates. Since the mid-90s the ATLAS group has made major contributions to the outer-

most part of the ATLAS detector that is designed to measure subatomic particles known as muons. More recently, the ATLAS group has made significant contributions to the ATLAS trigger system, computing, and data analysis. The team has embarked on a new analysis effort to understand and measure the properties of the new boson and search for evidence of novel non-Standard Model particle production mechanisms.

The CMS group at BU is led by Professors Tulika Bose, Jim Rohlf, and Larry Sulak, and includes Research Assistant Professor Arno Heister, several research scientists, as well as graduate and undergraduate students. Members of the team helped design the

upper-level management of the experiment. The group members also play leading roles in the analysis of the collision data and are searching for exotic particles predicted by several new physics theories. These models aim to resolve some of the other great mysteries of particle physics: the nature of the dark matter that comprises about 20% of the mass of the universe and the explanation for the dominance of matter over antimatter in the universe — the very reason we are here.

The LHC is currently being upgraded to increase its collider energy, and its restart in 2014 will herald a new era in particle physics, with its unexplored energy domain providing unique oppor-



CMS event display of a Higgs particle candidate

CMS Hadron Calorimeter, an integral part of the experiment used to measure the energy of particles that emerge from the proton-proton collisions. They have also been instrumental in the design and commissioning of the CMS trigger system and are involved in the

tunities to search for new physics. Boston University will continue to play a leading role in the success of the LHC experiments as we strive to answer the fundamental questions of basic science and lead advancements in cutting-edge research and technology.

Muon g-2 storage ring moves from Brookhaven to Fermilab

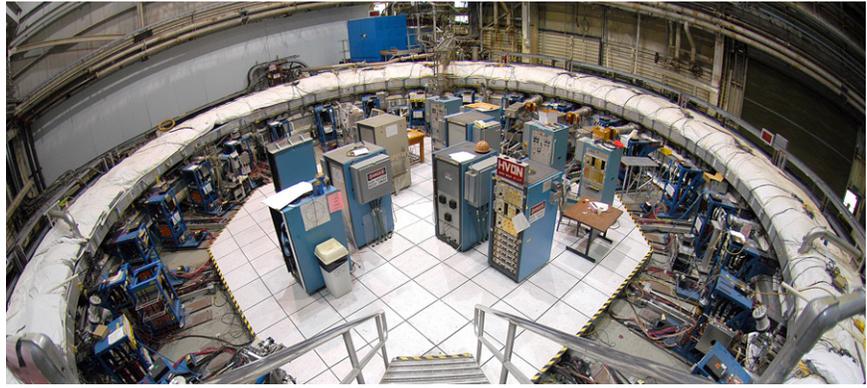
In preparation for the next generation g-2 experiment at Fermilab, this past July, the muon g-2 storage ring completed its massive move from Brookhaven to Fermilab. The 3200-mile journey took the ring down the Atlantic seaboard, around Florida, and up the Mississippi river by barge. The ring arrived in Lemont, Illinois, where it made its final trek along the Illinois highways by truck. The storage ring magnet will be installed in a new building beginning in mid-February, and should be assembled and operational by 2015.

The 650-ton precision storage ring stores muons to measure their anomalous magnetic moment. The high-precision measurement of the magnetic moment of the muon will be used to probe physics beyond the Standard Model. Differences between measured and predicted values of the magnetic moment may be signatures of undiscovered elementary particles.

Professor Lee Roberts is co-

spokesperson for the new experiment. Other collaborators at Boston University include Professors Jim Miller and Rob Carey, Research Associates Emma

Barnes and Ameya Kolarkar, and graduate student Nick Kinnaird. Significant components of the new experiment are being built by the Boston University SIF and EDF.



Top: An image of the muon storage ring installed at Brookhaven. Bottom L: The ring being shipped by barge around the eastern US. Bottom R: A truck carefully brings the storage ring along the Illinois tollway to its final destination at Fermilab.

New faculty member



Kirill Korolev joined BU in July 2013 as an Assistant Professor in the Department of Physics and in the Bioinformatics Program. Dr. Korolev received his PhD in 2010 from Harvard University, and spent three years as a prestigious Pappalardo Postdoctoral Fellow at MIT. His research focuses on questions in biology and physics related to population dynamics.

He is currently working on the evolutionary dynamics of cancer, early warning signals of population collapse, and the dynamics of alleles under density and frequency dependent selection during range expansions. All of these research interests fit in well with our burgeoning research effort in biological physics.

Alumni Accolades

We're pleased to report on some of the impressive achievements of our graduate alumni. If you have news that you'd like to share with us, please send it to physics-alumni@physics.bu.edu. We'd love to hear from you!

Eli Ben-Naim (PhD 1994) was appointed senior editor of Physical Review E.

M.V. Ramana (PhD 1995) is a co-recipient of the American Physical Society's 2014 Leo Szilard Lectureship Award, which recognizes outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in such areas as the environment, arms control, and science policy.

Oana Malis (PhD 1999), an assistant professor of physics at Purdue University, received a Faculty Early Career Development award from the National Science Foundation.

Michael Manfra (PhD 1999) and his team at Purdue University were awarded a \$1M research grant from the W.M. Keck Foundation to develop an ultrapure semiconductor capable of achieving correlated states.

Claudio Castelnovo (PhD 2006) was awarded the 2012 European Physical Society Condensed Matter Division Europhysics Prize for the prediction of magnetic monopoles in spin ice.

Local startup Silverside Detectors, Inc., co-founded by postdoc and former graduate student **Andrew Inglis** (PhD 2010), was one of 26 finalists in the 2013 MassChallenge Startup Accelerator, which supports high-impact, early-stage entrepreneurs by connecting them with

the resources they need to launch and succeed immediately. Inglis' company went on to receive \$125,000 for their work developing low-cost lithium thermal

neutron detectors, which would be a fraction of the cost of market-ready technology and would allow governments to build scalable networks of radiation detectors.



Physics Postdoc and co-founder of Silverside Detectors Andrew Inglis speaks to Massachusetts Senators Elizabeth Warren and Ed Markey about his company's lithium thermal neutron detector. Photo from The Daily Free Press

Faculty Award and Honors

Rob Carey was promoted to Full Professor as of Fall 2013. His research is in medium-energy precision physics, with active research projects at Fermilab and the Paul Scherrer Institut in Switzerland. Additionally, Rob serves as our Director of Undergraduate Studies, and is the faculty advisor for Photon, our undergraduate physics organization.

Antonio Castro Neto was elected a 2012 Fellow of the American Association for the Advancement of Science (AAAS). The organization, which publishes the journal *Science*, seeks to "advance science, engineering, and innovation throughout the world for the benefit of all people."

Bennett Goldberg received the 2012 United Methodist Scholar/Teacher of the Year Award in recognition of his commitment to both teaching and research. The award is given to a member of the Boston University faculty recognized for his or her "dedication and contributions to the learning arts and to the institution"; it was established and endowed by the General Board of Higher Education and Ministry of the United Methodist Church.

Teacher in Residence **Mark Greenman** was honored with the 2012 Paul W. Zitzewitz Award for Excellence in Pre-College Physics Teaching by the American Association of Physics Teachers (AAPT).

In addition to his 30-year career as a science educator at Marblehead High School in Massachusetts, Greenman has received many awards and honors, including the Presidential Award for Excellence in Mathematics and Science Teaching for Massachusetts and an Albert Einstein Distinguished Educator Fellowship from the National Science Foundation.

Theodore Moustakas, who holds joint faculty appointments in Electrical and Computer Engineering, Materials Science and Engineering, and Physics, won BU's 2013 Innovator of the Year Award. The award recognizes faculty members who have conducted peer-recognized world-class research and whose research projects show potential for commercialization. Moustakas is the co-inventor of the blue light-emitting diode (LED), and is the founder of RayVio Corp, a producer of ultraviolet LEDs - compact, environmentally friendly substitutes for mercury lamps used in water purification and disinfection systems.

Claudio Rebbi was awarded the 2013 Gitner Award for Distinguished Teaching by the College of Arts and Sciences. The award recognizes distinguished teaching in the broadest sense, including classroom performance, course and curriculum development, mentoring and academic engagement with students outside the classroom, and enhancement of teaching and learning scholarship.

Kevin Smith is taking a two-year leave of absence to assume the position of Head of the School of Chemical Sciences at The University of Auckland. This is a great opportunity for him and we wish him the best over the next two years.

Student Award and Honors

We're very proud of our students for their great accomplishments over the past year.

At our commencement ceremony last May we recognized a number of students for their academic excellence. **Claudio De Mutiis** won the Alumni Award for Achievement in Physics, **Dasom Lee** won the College Prize for Excellence in Physics, and **Trey Wenger** was inducted into the honor society Phi Beta Kappa.

At our annual Edmonds Lecture, our department also recognized the following graduate students for their excellence in research and in teaching: **Tom Iadecola** received the Gertrude and Maurice Goldhaber Award in recognition of his outstanding research and academic performance as a first-year graduate student, **Alex Kitt** received the Alvaro Rocco Memorial Award in recognition of his overall research accomplishments, and **Clint Richardson** received the Teaching Fellow of the Year Award.

A number of our students have been recognized over the past year for their achievements. **Emma Rosenfeld**, a junior Physics major, was named a Clare Boothe Luce Scholar for Summer 2013. The

award supports undergraduate research projects undertaken by female US citizens. Emma worked with the Boston University ATLAS group to develop procedures for building and operating a new type of particle detector called Micro-megas to measure the properties of muons produced in collisions at the LHC and to fully explore the characteristics of the recently discovered Higgs boson. Emma also received third place at the 16th Annual Undergraduate Research Symposium held at BU on October 18, 2013 for her poster, *Evaluation of a MicroMegas Muon Detector and Development of an Electronics Testing System for Multi-Channel Detectors*, which was based on her research with the ATLAS group.

Joao Ricardo Santos and **Elsa Abreu** were recipients of Furnace Para a Cynical e a Technologic PhD in Physics fellowships from Portugal.

Shainen Davidson was the recipient of a postgraduate scholarship from the Natural Sciences and Engineering Research Council of Canada.

Gustavo Marques Tavares was the recipient of an NSF fellowship under the LHC Theory Initiative. It was one of three given out nation-



Undergrad Emma Rosenfeld (far left) and fellow finalists at the 16th Annual Undergraduate Research Symposium.

wide and supported his work on theory and predictions of an asymmetric production of top and anti-top quarks at the Tevatron and the LHC. Marques Tavares was also awarded a two-year DOE Graduate Fellowship in Theoretical Physics to support his current research on Physics Beyond the Standard Model of Particle Physics. He is using this support to work on new techniques for studying quantum field theories at strong coupling, which are difficult to describe quantitatively. For the future he plans to investigate naturalness of electro-weak symmetry breaking and associated properties of the newly discovered Higgs boson.

Cory Fantasia was selected as one of 15 winners of a competition organized by the United States Large Hadron Collider Users Organization for his talk entitled *Search for exotic WZ resonances with the CMS detector*.

Tom Iadecola led the research that culminated in an important publication, *Materials Design from Nonequilibrium Steady States: Driven Graphene as a Tunable Semiconductor with Topological Properties*, in the prestigious journal *Physical Review Letters* as a first year graduate student.

Mikkel Jensen was highlighted in *The Journal of Biological Chemistry* for his work *The conformational state of actin filaments regulates branching by Arp2/3 complex*. The article was chosen by the editorial board as the Journal's paper of the week for its significance and overall importance.

Mike Kruskal won an award for his poster, *Backgrounds in the Endcap Region of the ATLAS Muon System*, at the 2012 US ATLAS Workshop at the University of Michigan.

On December 4, 2013, graduat-

ing seniors **Emma Rosenfeld** and **Daniel Shaffer** will be inducted into this year's Phi Beta Kappa cohort.

Renovations

We embarked on several major renovations this year. Our studio classroom was completed in the basement of SCI, and will allow us to develop and employ exciting new teaching technologies to their full advantage. We plan to offer many more sections of our introductory courses in Studio mode this year.

Over the past year, we've expanded the office space for graduate students on the second floor of SCI and created a large 14-seat office next to the department office that accommodates a

substantial fraction of the entering class. Now all entering graduate students are housed in comfortable and well-appointed offices that are centrally located, which should make it much easier for them to feel like part of our physics family!

We also updated our Advanced Laboratory to include a large number of new experiments, and the Electronics Laboratory was modernized and will be moving into a more permanent location in PRB this academic year.



Top L: New studio classroom. Top R: New graduate student office. Bottom: Renovated study space in the basement of SCI.

Notes from Graduation 2013

We're pleased to report on the current placement of our most recent BA and PhD recipients.

Undergraduates

[Daniel Arcaro](#) is a graduate student in physics at Boston University.

[Kelsey Bilsback](#) is a graduate student in engineering at Colorado State University.

[Brian Borucki](#) is a graduate student in computer science at Boston University.

[Claudio De Mutiis](#) is a graduate student in engineering at Boston University.

[Joshua Gray](#) is a graduate student studying medical physics at the University of Texas, Houston.

[Shamavi Hasan](#) is a health care software programmer and technical analyst.

[Eeshan Kabir](#) is a software engineer at Navinet.

[Dasom Lee](#) is an exhibit maintenance manual intern at Boston Museum of Science.

[Kevin-Druis Merenda](#) is a graduate student in physics at the Swiss Federal Institute of Technology.

[Kripa Patel](#) is a biomedical research assistant at Massachusetts General Hospital.

[Joseph Samaniego-Evans](#) is a graduate student in physics at the University of Colorado, Boulder.

[Kyle Schluns](#) is a quality assurance engineer at Air Worldwide.

[Alexander Sirota](#) is a graduate student in physics at the University of Virginia.

[Aaron Sternbach](#) is a graduate student in physics at the University of California, San Diego.

[Trey Wenger](#) is a graduate student in astronomy at the University of Virginia.

Graduates

[Eitan Anzenberg](#) is a postdoc at Lawrence Berkeley National Lab.

[Andrew Clough](#) is a postdoc at Oklahoma State University.

[Luca D'Alessio](#) is a postdoc at the University of Pennsylvania.

[Nicolas Di Fiori](#) is a software engineer at Ab Initio.

[Xuqing Huang](#) is a financial software engineer at Bloomberg.

[Mikkel Jensen](#) is a postdoc at Harvard University.

[Songbo Jin](#) is a data scientist at Litle & Co.

[Guanliang Li](#) is a principal engineer at Pharos Science and Application.

[Wei Li](#) is a quantitative analyst at State Street.

[Kang Liu](#) is a postdoc at Brigham & Women Hospital/Harvard Medical School.

[Jiayuan Luo](#) is a data analyst at Trip Advisor.

[Jason Olejarz](#) is a postdoc at Harvard University.

[Dongdong Peng](#) is a seismic imager at CGGVeritas.

[Justin Phillips](#) is a postdoc at Massachusetts General Hospital.

[Erica Saint Clair](#) started a photography company, Saint Clair Studio.

[Kevin Stokely](#) is a postdoc at Columbia University.

[Daniel Volovik](#) is a mathematical modeling analyst at Delfigo Security.

Faculty in Transition

We have a number of faculty members who are transitioning this year. Bill Skocpol will retire in June of 2014 after a 27-year career at BU. We wish him all the best in the next phase of his career. We're also sad to report that Rick Averitt will be leaving our faculty in January of 2014 to join the Physics Department at the University of California, San Diego. Rick has been a faculty member at BU since 2006 and had an incredibly successful career in our department. He will be difficult to replace, and we wish him the best at UCSD.

On a personal note, I will also be leaving in June of 2014 after a 36-year career at BU to become a Resident Faculty member at the Santa Fe Institute in Santa Fe, New Mexico. I have deep roots at BU and I also have many fond experiences and memories with so many of you. Given my long tenure at BU, it was difficult to envision leaving, but this opportunity at the Santa Fe Institute is so exciting that I couldn't pass it up. If you will be in the Santa Fe area, I hope that you will let me know!