

### Simons Center for Geometry and Physics

On February 26, 2008, Stony Brook University and the Simons Foundation announced the establishment of the Simons Center for Geometry and Physics, endowed by a gift to the university from the Simons Foundation, the largest such gift (\$60M) in the history of the State University of New York. A new building, adjacent to the Physics and Mathematics buildings, will be built for the Simons Center which will have direct connections to the current buildings. These physical bridges will reflect and encourage close institutional relations of the Center and its faculty with the graduate programs in Physics & Astronomy, and Mathematics.

A little background: the donors, James and Marilyn Simons, have long-standing Stony Brook connections: Marilyn Simons as a Stony Brook alumna, and James Simons as the former chair of our Mathematics Department, a distinguished mathematician in his own right, and now as the Chairman of Renaissance Technologies, a well-known financial firm with headquarters in nearby East Setauket. The Simons Foundation has supported numerous scientific and educational activities nationwide, including many here at Stony Brook. Each year, "Simons Lecturers" visit Physics & Astronomy and Math, and the past five summers have seen a series of "Simons Workshops in Mathematics and Physics", which have brought leading theoretical physicists and mathematicians to Stony Brook from around the world. In many ways, the Center for Geometry and Physics will bring our activities to a new level at the forefront of these fields. The Center will bring seven new senior faculty to Stony Brook. Its first permanent member is Michael Douglas, one of the leading lights of string theory, who will join the Stony Brook faculty this summer. The Center's building will host ongoing research programs and visits, with room for as many as thirty visitors at a time. It will undertake cultural programs as well.

First and foremost, the Center is a place where some of Stony Brook's greatest contributions to science and math will be continued, strengthened and extended. The Center's research will evolve as it grows, but it is safe to anticipate that it will concern fundamental issues of the physics and mathematics of space, fundamental forces, information, cosmology. Stony Brook has already had an extraordinary success at the shared frontiers of physics and mathematics in these areas, at least since Chen Ning Yang arrived in 1966 and founded the (now Yang) Institute for Theoretical Physics. James Simons came and built up programs in mathematics not too long after. The tradition of mathematics-physics collaboration that they established here has had a world-wide influence, and was, in fact, celebrated at a conference this month. The list of talks and speakers can be found at [www.stonybrook.edu/sb/simonsyang/](http://www.stonybrook.edu/sb/simonsyang/).

As the Center develops starting this coming summer, it will further strengthen Physics & Astronomy, other related departments and their grad programs, making Stony Brook even more attractive to the best faculty in all fields. It will bring new opportunities in graduate study, new grants, and new oppor-



tunities for collaborative research. In summary, the Simons Center will further confirm Stony Brook as a research and educational destination known throughout the world. Finally, the new building, which is on a fast track for design and construction, will add to the sense of growth and vitality on campus—and those of us down at this end of things, near the power plant, will see things look a lot nicer once the dust settles in just a few years!

*George Sterman  
YITP Director*

### Welcome to Alan Calder

Alan joined the department as an Assistant Professor in September 2007, from a Research Scientist appointment at the University of Chicago. He was hired as part of a "cluster hire" associated with the New York Center for Computational Science.

Alan's research is in astrophysics and he is particularly interested in bright stellar explosions known as supernovae. Alan investigates these events with numerical modeling and simulation and, accordingly, he is interested in the requisite basic physics such as radiation transport, turbulence, and turbulent combustion. Alan is also interested in



the broader problem of quantitatively assessing the validity of simulations of multi-scale, multi-physics phenomena, a critical part of the process of computational science. In the course of his research, he has investigated a variety of astrophysical events, including both core collapse and type Ia supernovae, classical novae, and coalescing neutron stars. Currently he continues his research in type Ia

supernovae and is working with SBU collaborators on the problem of neutrinos radiating from nascent neutron stars.

Originally from Georgia, Alan received his PhD from Vanderbilt University. His hobbies include running, hiking, and mountain biking, and he hopes to develop a new hobby of fly fishing for trout in the beautiful Long Island streams.

## Welcome to Matt Dawber

Matt joined the department in January as an Assistant Professor. Originally from Sydney, Australia, Matt has long since hung up his crocodile wrestling hat in order to pursue research on ferroelectric oxide materials. After obtaining a PhD from the University of Cambridge, UK, in 2003, Matt spent the



last four years at the University of Geneva, Switzerland.

Matt has worked on a number of problems in ferroelectrics (materials with a switchable spontaneous electrical polarization), from early work on defect related failure mechanisms, to studies of size effects in ultra-thin films and most recently has

focused on the fabrication, characterization and comprehension of artificially layered ferroelectric superlattice structures. His most recent discovery of a form of interfacially driven "improper" ferroelectricity in these structures represents a significant breakthrough and will appear shortly in *Nature*. Matt's position as a leading expert in ferroelectrics is reflected by his highly cited review article in *Reviews of Modern Physics* on the "Physics of thin-film ferroelectric oxides". Matt's lab will combine synthesis capabilities with a broad range of experimental characterization options. These, in tandem with facilities at Brookhaven, and collaborations with leading theorists, will provide the capability to develop a broad range of new "nano-engineered" ferroelectrics with exceptional properties.

## Welcome to Marivi Fernandez-Serra

Marivi joined the department in January 2008 as an Assistant Professor. Originally from Madrid, Spain, she graduated from the University of Cambridge, UK, at the end of 2004. A key result of her thesis was the characterization of the structure of liquid water using first principles simulations, resulting in a breakthrough publication in *Physical Review Letters*, which attracted the attention of various media, including *Science Magazine* and *El Pais*, the most important Spanish newspaper. Eager to learn about the physics of other "less disordered" systems she moved to Lyon, France first as a CNRS postdoc and later as a Marie-Curie postdoc working in CECAM (European Center for Atomic and Molecular Simulations). During her 3 years as a postdoc she studied the electronic structure and transport properties of semiconductor nanowires, and the physics of other low dimensional systems, publishing her results in a number of leading journals, and demonstrating an ability to

master a broad range of physics problems. However, her will to fully understand the structure of liquid water was too strong to give up on her search, and she plans to continue



this line of research here at Stony Brook, together with the study of other nano-structured and biological materials presenting physical properties that can only be understood by performing a detailed analysis of their electronic structure using *ab initio* simulations.

Marivi is one of the 6 University-wide hires by the New York Center for

Computational Sciences (NYCCS). Her research program combines both large scale simulations and theoretical modeling, and will benefit from New York Blue, the centerpiece of NYCCS, an IBM Blue Gene/L massively parallel super-computer with a peak performance of 103.22 teraflops.

## Welcome back to Derek Teaney

Derek joined the department in September 2007 after completing a PhD at Stony Brook and having held postdoctoral positions at Brookhaven National Laboratory and Stony Brook. His wife, Dr. Rachel Boykan, joined the faculty in the Department of Medicine at the same time.

Derek is involved in understanding the physics of gauge theories under extreme temperatures and densities. This interesting regime which amalgamates non-abelian gauge theories, statistical mechanics, and relativity is currently studied at the Relativistic Heavy Ion Collider (RHIC) by colliding heavy nuclei at ultra-relativistic energies. Derek has explored the kinetics of these events using a variety of techniques ranging from Lattice QCD, the gauge gravity duality, and plasma physics. Some of this work was done in close collaboration with former and current Stony Brook PhD students. Derek is also looking forward to further strengthening the already close collaborations between the



nuclear theory and experimental groups.

Derek, a RIKEN-BNL Fellow, received an Outstanding Junior Investigator Award from the Department of Energy last summer, and an Alfred P. Sloan Fellowship in the spring of this year.

## Alexander Mitov



A researcher in the Department of Theoretical Physics at Liverpool University, UK, joined the C.N. Yang Institute for Theoretical Physics (YITP) for the spring semester as the first winner of a National Science Foundation Large Hadron Collider Theory Initiative Postdoctoral Fellowship.

The Large Hadron Collider, or LHC for short, is by some measures the largest scientific instrument ever built. Its construction phase is nearly complete at the European Center for Nuclear Research in Geneva, Switzerland. It is designed to probe the origin of the Standard Model, the spectacularly successful, yet fundamentally incomplete contemporary theory of elementary particles and forces. White at Stony Brook, Dr. Mitov is studying higher-order corrections to such important LHC processes as heavy flavor production and precision top-quark studies.

The interpretation of LHC data will require an unprecedented international collaboration of theoretical and experimental physicists. The NSF's LHC Theory Initiative is intended to enable young theorists at the postdoctoral and graduate level to take part in this scientific drama as it unfolds. According to YITP Director George Sterman, Dr. Mitov has already made important contributions to the theory of the strong interactions, known as quantum chromodynamics, which is a part of the Standard Model.

Among Mitov's specialities are predictions for how particles known as heavy quarks will be produced at the LHC. Over a decade ago, the Stony Brook led experiment "DZero" at Fermilab discovered the heaviest quark of all, the so-called "top", relying in part on theoretical advances developed at the YITP. The LHC will make possible for the first time a truly clear look at the top quark's properties.

## A letter from Shaul Shaul

In the spring of 1968 Peter Kahn, then Director of the Undergraduate Program of the Physics Department, interviewed Erwin Goldmark and myself, two 38 year old EI Al navigators, freshly out of Suffolk Community College. We were trying to join the Department as second year undergraduates. To my everlasting gratitude Peter did not deny us the chance to prove ourselves. With a gracious wish for "success in our studies" he changed the direction of my worldline. An abiding friendship between us ensured, which is as strong today as it was during my Stony Brook days.

Stony Brook's Physics Department curriculum for undergraduates proved to be a serious challenge. We were competing for survival with a closely knit group of Chinese students, and some very bright young North and Latin Americans. To stay abreast all classes had to be attended, which

meant one of us had to be at all times on campus, so for the next five years I flew out to Europe only when Erwin came back from a flight.

Early in 1973, I attended several lectures by Nandor Balazs on advanced statistical mechanics and on the ten tensor equations of general relativity. Hubris lured me to ask him if he would consider becoming my advisor towards a doctoral degree in physics or astrophysics. Nandor took my measure and saw that a real dissertation in physics would be way, way above my level of competence, but some investigatory project in astronomy was feasible. He had purchased for the University in the late sixties a complete set of paper copies of the glass plates of the Palomar Observatory Sky Survey (POSS-I). The survey had captured the images of millions of galaxies seen at all angles to the observer's line of sight: from face-on to edge-wise, their spiral, lenticular, elliptical and irregular appearances easily discernible with a magnifying glass. Nandor was interested about distributions of galactic characteristics in the 3D celestial sphere. As a warm-up endeavor he recommended the study of hypergeometric functions, with applications to extreme value distributions.

Unfortunately I was called back to Israel and couldn't continue my studies. But my education at Stony Brook came in handy. A year after landing in Israel I was appointed to represent EI Al on the panel of the International Air Transport Association (IATA) charged with assessing the probability of mid-air collision across the North Atlantic routes—should the distance and altitude separation between aircraft equipped with advanced navigational systems be reduced from 120 nautical miles and 2000 feet to 60 nautical miles and 1000 feet apart. Having followed Nandor's recommendation paid off now: I developed for the panel a 'collision risk model' based on extreme value statistics for the forecasted air-traffic volume during the period 1980-2010. The risk per flight derived by the model was less than one in six million, a hazard level adopted as acceptable by the panel. Consequently IATA supported the 1978 promulgation of reduced aircraft separation standards across the North Atlantic.

After retirement in 1999, I was accepted to the Zoology Department, Faculty of Life Sciences in Tel Aviv University, as a student in Molecular Biology. One class led to another, a term paper became an article published in the *Gene Journal* in 2002, and in 2006 a second article was published, in *BMC Evolutionary Biology*. In between I commenced a PhD research project, which led to a dissertation submitted this December to the Senate of Tel Aviv University. The defense of the thesis is scheduled for January 23, 2008. I will be 78 years old when I receive the degree and I am not sure that I want to try another subject for a while. But so much appeals to me.

To all my teachers at Stony Brook: thank you. Being guided by you through the halls of science then, made the difference now.

## Stony Brook Faculty, Staff, Students and Alumni Making News

**Michael R. Anastasio** PhD 1976, Director of the Los Alamos National Laboratory, received a Distinguished Stony Brook Alumni Award.

**Ilan Ben-Zvi** has won the 2008 Merit Award of the IEEE Nuclear and Plasma Sciences Society “for outstanding contributions to the fields of high energy physics and free electron lasers”.

**Kieran Boyle** (Abhay Deshpande, PhD supervisor) and **Jeremy Holt** (Gerry Brown and Tom Kuo, PhD supervisors) will each receive the President’s Award to Distinguished Doctoral Students in May.

**Kieran Boyle** has also been awarded the Wilcox Prize for excellence in experimental PhD research.

**Rama Calaga** 2006 (Ilan Ben-Zvi and Steve Peggs, PhD supervisors) received the 2007 Doctoral Research Award from the American Physical Society Division of Physics of Beams (DPB).

**Thorsten Dahms** won a Nuclear Physics Young Scientist Award for his talk *Measurement of thermal photons in heavy ion collisions with PHENIX* at the Quark Matter 2008 conference.

**Peng Dai, Manas Kulkarni, Michael McCumber, Jason Reeves** and **Clint Young** have each been awarded the Peter B. Kahn Prize for graduate student travel.

**Maaneli Derakhshani** has been awarded the John S. Toll Prize for the outstanding Senior.

**Vincent Gallucci** (B.S. 1963 PHY/Pol.Sci. minor) is the Lowell A. and Frankie L. Wakefield Professor of Ocean and Fisheries Science at the University of Washington. He visited Stony Brook and the department last fall and on Sept. 18, 2007 gave an invited Provost’s Lecture on ‘Sharks in Perspective’. Vinnie is a renowned expert on elasmobranchs, especially sharks.

**Jeremy Holt** has been awarded the Dresden Prize (theoretical thesis).

**Barbara Jacak** has been elevated to the rank of Distinguished Professor.

**Jonathan Kaufman** has been awarded the David Fox Prize to the best Teaching Assistant

**Brendan Keller** and **Jonathan Langdon** have been awarded the Soroff prize for outstanding contributions in Physics.

**Devora Klein** (Physics Major, Teacher Certification) and **Ka Ho Poon** (Electrical Engineering Major: Mechanical Engineering and Physics Minors) have been awarded the Chancellor’s Awards for Student Excellence.

**Laszlo Mihaly** has been chosen to receive the Dean’s Award for Excellence in Service to Graduate Education by a Graduate Program Director.

**Christian Mirchel** has been awarded the Edward Lambe

Prize for science and teaching.

**Sarah Nichols** has been awarded the Silsbee Prize for the most outstanding graduate student, as measured by courses, comps, and other accomplishments.

**Chuck Pancake** will receive the Chancellor’s Award for Excellence in Professional Service in October, 2008.

**Ketur Patel, Victoria Muñoz** and **Corinne Hotaling** have been awarded the Feingold Prize for outstanding students in intro AST.

**Derek Teaney** was selected as a 2008 Alfred P. Sloan Foundation Research Fellow.

**Gang Wang** has been awarded the Di Tian Prize recognizing Asian graduate students studying physics.

**Zhengwen Zhang** and **Dominik Geissler** have been awarded the T.A. Pond Prize for the highest comprehensive exam scores.

In May 2008, the newly rehabbed seminar room C-133 in the Physics Building will become the **Gerald E. Brown** Nuclear Theory Room to commemorate Gerry’s efforts to inspire and educate numerous students and collaborators, his groundbreaking contributions to nuclear physics, and his commitment to the excellence of Stony Brook University.

### Outstanding Referees Award

Since March 1, 2007 our Distinguished Professor **Gene Sprouse** has been serving as Editor-in-Chief of the American Physical Society (APS), one of the top three leadership positions in the Society. Those of us who have been paying attention for more than the past year or two to APS publications, both in print and online, already notice a number of welcome improvements taking place under Gene’s stewardship. One recently announced improvement is the inauguration of the *Outstanding Referees Program*. Peer-reviewed journals rely on expert, anonymous (to the authors) referees to evaluate and give expert advice to journal editors on the suitability of each manuscript submitted for publication. This is a daunting task, both for the editors who must select suitable referee(s) for each submittal, solicit reports from them, and then decide whether a given manuscript should be rejected, subjected to improvement for possible acceptance, or accepted outright; and for the referees, who can end up spending many hours—even days—of work evaluating a single manuscript.

The numbers are huge. The APS has long kept databases on their referees and reports that over the last two decades, over 50,000 referees have been called on to review manuscripts. The number of manuscripts is large and growing; in 2007 approx. 33,000 were submitted, each requiring review. As one would expect, not all referees are equally diligent about doing the work and supplying a timely review to the editor requesting it. Those who do respond relatively quickly have usually been rewarded with more manuscripts sent to them for review. That is, until now—the new *Outstanding Referees Program* was introduced under Gene’s stewardship to recognize the dedicated service of the crème de la crème of APS journal referees. In this, the first year of the program, six of the 534 honored referees came from our department: **Phil Allen, Thomas Bergeman, Fred Goldhaber, Barry McCoy, Hal Metcalf** and **Edward Shuryak**.

## Letter from the Chair

We've had another busy year in the department. This brief letter and articles elsewhere in the newsletter give some highlights about people and notable events. Our faculty colleague of four decades, **Bob McGrath**, stepped down as Provost last October after nearly a decade of dedicated service to the University. Bob continued his activities overseeing Stony Brook's role as co-manager of Brookhaven National Laboratory while he and his wife Carolyn moved their geographical location from Long Island to Virginia, where we wish them well. After a national search, former Dean of Engineering at the University of Delaware Eric Kaler became Provost and recently was also named VP for BNL Affairs. Searches for tenure-track assistant professors in the department have come to a happy conclusion. We received permission to consummate two hires to fill vacancies in observational astronomy created by the retirements of **Mike Simon** and **Phil Solomon** at the end of the semester, (see elsewhere in this Newsletter the sad news of Phil's death in late April) and the resignation of **Aaron Evans** at the end of the fall semester to accept a joint University of Virginia-NRAO position. Two outstanding candidates, Dr. **Stanimir Metchev** (to arrive in August) and Dr. **Jin Koda** (to arrive in January) have accepted offers from the chair. We received permission to consummate the hire of a high-energy physicist whose research will be focused on the ATLAS detector at the new Large Hadron Collider at CERN. Dr. **Dmitri Tsybychev** has accepted an offer from the chair and is expected to begin his faculty appointment in January. Last year we hired four tenure-track assistant professors; each is off to a good start and is featured elsewhere in this newsletter.

Renewal is taking place in the departmental staff as well. Filling a vacancy created by the retirement of **Diane Siegel**, **Diane Diaferia** joined the main office in January and immediately got to work in the graduate admissions process. We had a relatively large graduate class enter last year (around 40) and aim for a similar number this year. Based on data published by the American Institute of Physics, our department is once again ranked fifth nationally in the number of PhD degrees awarded annually (three-year running average).

With Director of the Undergraduate Program (DUG) **Deane Peterson** going on sabbatical leave in January 2008 for a year, former DUG (2001-2) **Phil Allen** kindly agreed to fill in until Deane's return. Filling a vacancy created by the retirement of **Tony Stabile**, **Paul DiMatteo** joined the machine shop in January, and **Jeffrey Thomas** joined us in May to fill an earlier vacancy.

**Clark McGrew** was promoted to Associate Professor with tenure and is busy working on DOE-funded construction of the "POD" detector on the D-level with other members of the NN(I think this is short for Nucleon Decay and Neutrino Interactions) Group led by **Chang Kee Jung**. The detector will become part of T2K, a second-generation neutrino-oscillation experiment in Japan.

The flock of awards and honors won by faculty, students, and staff in our department during the past year are noted elsewhere in the newsletter, and I hope I didn't miss any.

It remains a personal pleasure for me to serve such an excellent department as its chair. I'm sure most of you are aware of the ongoing financial needs of the department to support

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## For Graduate students (and Others) Considering *Interdisciplinary Research*

Physicists generally carry a world view of seeking a fundamental understanding of problems that interest them. This has led to the great success of physics as a field of science and the great impact of physics on our technological society. But the quantitative outlook and "can-do" attitude of physicists also lead to exciting opportunities for people with a physics background to contribute to other fields of research. These opportunities frequently arise at the beginning of a research career, in the choice of a Ph.D. thesis topic. It may, therefore, be worthwhile for us as the two most recent Stony Brook Physics & Astronomy Graduate Program Directors to offer a few comments about interdisciplinary research, especially based on experience in this department.

Phenomena such as nuclear magnetic resonance and x-ray diffraction were of fundamental importance when they were first conceived and subsequently observed and explained by physicists. Their advancement has led to the current state of affairs where they are routinely used as tools in many disciplines; we will consider molecular biology as an example. The complexity of information on protein structure and function available from contemporary application of those techniques would have astonished Laue, the Braggs, Purcell, and Bloch at the time of their respective discoveries. But even though these methods are now thoroughly ensconced in biology laboratories, physics students, including a number of recent graduates from this department, are playing important roles in developing and applying them.

We suggest two important points for a student starting interdisciplinary research to keep in mind. One is that you must build your own expertise in the new field you are entering. Immerse yourself in your chosen topic by keeping up with seminars and attending schools and conferences. This is crucial for developing your own judgment of what are interesting unsolved problems and how your instincts and skills as a physicist can contribute to scientific progress. Though your colleagues in your newly chosen field should value you for the approaches you bring from physics to their problems, they will play a crucial role in identifying issues that are at the forefront and worth working on. They will also help you learn the (non-physical) science you will need. The other is to keep your physics skills sharp. You can hope to distinguish yourself from others in that field by bringing the skills, mindset, and ideas of the physicist to these problems worth working on.

A few more examples: current students and recent graduates are also involved in simulations of complex networks of signaling pathways among enzymes in bacteria. Stony Brook Physics and Astronomy students have done Ph.D. research using fluorescence microscopy to trace the wiring diagram of a rat's brain, carried out millimeter wave spectroscopy in Antarctica to study the evolution of the ozone hole, and performed state-of-the-art computations of the Earth's climate, to name just a few. All of these students have earned doctoral degrees in Physics. The department sponsors seminars in which prospective advisors can come and speak with our students, and is very flexible about setting up appropriate thesis committees to advance your interests.

*Laszlo Mihaly and Peter Stephens*

## URECA Celebration of Research and Creativity April 30, 2008

**Chris Arettines** (MAT/PHY minor)  
(F. Walter—advisor)

*Search for Variable Stars near the S CrA dark Cloud*

**Bartosz Bogucki** (PHY)  
(D. Schneble—advisor)

*The Optimization of Micrometer Gaussian Beam Diameter Measurements for Optical Traps*

**Christina Bunker** (AST/PHY minor)  
(F. Walter—advisor)

*Just How Far is This Cataclysmic Variable Star? A New Measurement of Proper Motion and Parallax of EF Eri*

**Maaneli Derakhshani** (PHY)

(H. Metcalf and S. Putterman—advisors)

*The Star is a Jar: A Survey of Historical and Current Developments in Sonoluminescence and Sonofusion Research*  
H. Metcalf and S. Goldstein—advisors)

*Quantum Theory without Observers: the de Broglie-Bohm Pilot Wave Theory of Quantum Mechanics and Fields*

**Niya Grozeva** (GEN)  
(J. Noé—advisor)

*Optical Analysis of the “Micro Bank” Toy*

**Elizabeth Hampton** (AMS)  
(J. Noé—advisor)

*Demonstrating Fractal Reflections between Reflective Spheres*

**Tiffany Kataria** (AST/PHY)  
(M. Simon—advisor)

*Computer-modeling the Detection of Exoplanets around Target Stars)*

**Brendan Keller** (PHY)  
(T. Weinacht—advisor)

*Local Control Algorithm*

**Sang won Lee** (PHY)  
(A. Deshpande—advisor)

*Si VTX Tracker for PHENIX detector*

**Thien An Nguyen** (PHY)

**Sergiy Nazarenko** (PHY)

**James Cabrera** (MAT)

(H. Metcalf/T. Weinacht—advisors)

*Measuring the Linewidth of Tunable 780 nm Diode Lasers*

**Thien An Nguyen** (PHY)  
(H. Metcalf—advisor)

*Non-Confocal Fabry-Perot Spectrum Analyzer*

**Raema Obbie** (ENS/AST)  
(M. Simon—advisor)

*Does Mother Nature Favor Equal Mass Twins?*  
(see photo on page 7)

**Manushi Shah** (CSE/BME)  
(J. Noé—advisor)

*Modeling the Optics of the Eye and Corrective Lenses*

**Dan Sun** (Exchg.Stu.)  
(M. Fernandez-Serra—advisor)

*Modeling the Electrostatic Potential between a Model-H<sub>2</sub>O Dipole Matrix with Different Molecular Orientations and Metallic Surfaces*

## Sigma Pi Sigma

At the 30th annual ceremony on April 18, 2008, the following outstanding students were inducted into the Stony Brook University Chapter of Sigma Pi Sigma:

**Tomasz Bakowski**

**Bartosz Bogucki**

**Christina Bunker**

**Cory Clifton**

**Maaneli Derakhshani**

**Zeng Fan**

**Brendan Freeman**

**Tiffany Kataria**

**Brendan Keller**

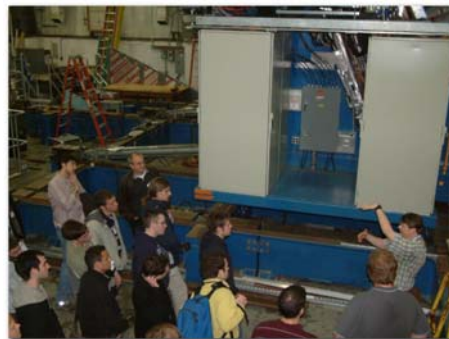
**Christopher Peltzer**

**Jude Safo**

## Visiting Weekend March, 2008



All the visitors at Brookhaven National Laboratory



Tom Hemmick explains the PHENIX detector



Dinner with **Marivi Fernandez-Serra**, **Matt Dawber** and current graduate students

## Talks Viewable by Streaming Video

Departmental colloquia are presented each Tuesday afternoon during the academic year in Harriman 137. The schedules are posted at <http://www.physics.sunysb.edu/Physics/colloquium.shtml>. If you'll be in the area, drop by and attend. Two years ago we began to record colloquia and have since posted most of them. Go to the posted schedules. If Movie of Presentation appears after an abstract, it is a link to the streaming video of the talk. You'll need a high-bandwidth internet connection and the Quick-time viewer, which is available for free download from the Apple web site. If you don't hear sound (as happens on some computers for some reason), click on the loud-speaker icon in the lower-left corner of the picture frame to expose a slider button. Move it up with your mouse, and the sound should be there.

Some other talks are also viewable. The NYCCS Seminars posted at <http://www.stonybrook.edu/sbccs/seminars/seminarlist.shtml> are of interest because two of the six new faculty in last year's "cluster hire" for the new Yew York Center for Computational Science are in Physics and Astronomy; see articles on Alan and Marivi elsewhere in this newsletter. Seminars of The Hera Group posted at <http://www.sinc.stonybrook.edu/Clubs/hera/> are also worth noting because of the involvement of our graduate Luigi Longobardi and his colleagues in organizing them, which included a series called "Global Warming Perspective".

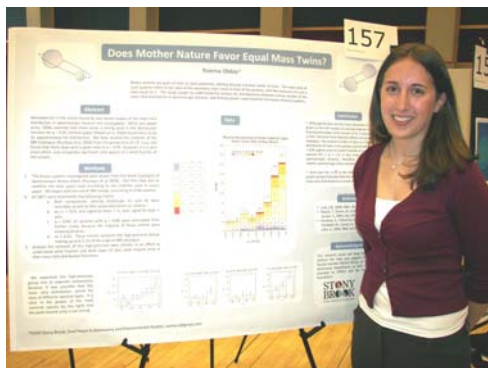
## Letter from the Chair cont'd.

fellowships for students, to begin new projects associated teaching, research, or their intersection or to respond to unexpected events or needs in the lives of our students, staff, or faculty.

Please consider making a donation to the department. Instructions for doing this are at <http://www.physics.sunysb.edu/Phycis/donate.shtml>.

Thank you all for your dedication, hard work, and support.

*Peter Koch*



*Raema Obbie at the URECA Celebration*

## In Memoriam Distinguished Professor Phil Solomon



Our Stony Brook faculty colleague of three and one-half decades, Distinguished Professor Phil Solomon, passed away on Wednesday, April 30 after a bout with cancer.

Phil received a PhD in astronomy from the University of Wisconsin in 1964. After postdoctoral and visiting positions at Princeton, Columbia, and UC San Diego, he spent two years on the faculty at the University of Minnesota, where he rose to the rank of Professor. After three years at the Institute for Advanced Study in Princeton, NJ, he came to Stony Brook as Professor of Astronomy in the Department of Earth and Space Sciences. With the departmental realignments a decade ago, he and the other astronomers and astrophysicists moved to our Department of Physics and Astronomy, and soon after Phil was elevated to the rank of Distinguished Professor. Phil took sabbatical and other leaves at Churchill College and the Institute of Astronomy, Cambridge; the Institute for Advanced Study; l'Ecole Normale Superieure, Paris; Institut d'Astrophysique, Paris; Institut de Radioastronomie Millimetrique, St. Martin d'Heres; and again in Cambridge University.

Phil gained an international reputation for a series of observations/investigations on the presence of light molecules and their role in the Galaxy, atmospheres of stars and planets, interstellar molecular clouds, and the earth's atmosphere. He participated in many of the discoveries of millimeter wave astronomy, and focused primarily on the role of carbon monoxide (CO), using it to discover and map giant molecular clouds. Another favorite molecule was the chlorine monoxide (ClO), but this time in the earth's atmosphere, in particular in the stratosphere, where it plays an important role in the formation and destruction of ozone. Phil published more than 160 papers and supervised 7 PhD students, 6 at Stony Brook. He served on numerous review, visiting, and advisory panels and received the Alexander von Humboldt Senior Scientist Award in 1989. He has been listed in "Who's Who in America" since 1998.

As do we all, Phil enjoyed being recognized for his work and once told the following story with a smile and twinkle in his eyes. For an assignment he gave in an undergraduate astronomy course at Stony Brook, his students had to do some readings here and there. After the next class, one of his students came up to Phil and said, "Professor Solomon, I was reading the books, and they were writing about you and your work. You're famous!" Indeed, Phil was famous, he was our valued colleague, and we shall miss him.

Our condolences go to his wife Sheila, daughter Nina and son-in-law John, grand-daughter Sarah, and brother Mark.

<p><b>Bachelor's Degree</b></p> <p><b>December 2007</b>  <b>Tomoyuki Manabe</b>  (PHY)(OPT minor)(CSE)(Math minor)  <b>Hubert Krysiak</b> (PHY)  <b>Stephen Mancuso</b> (PHY)  (MAT)  <b>Warren Miller</b> (PHY)</p>	<p><b>Bachelor's Degree Candidates</b>  <b>May 2008</b>  <b>Peter Agcaian</b> (AMS/PHY)  <b>Keith Altman</b> (AST/PHY)  <b>Bartosz Bogucki</b> (PHY)  <b>Christina Bunker</b> (AST)(PHY)  <b>Sun Jun Chin</b> (CSE/PHY)  <b>Maaneli Derakhshani</b> (PHY)  <b>Zeng Fan</b> (AST/PHY)  <b>Michael Felder</b> (PHY)  <b>Brendan Freeman</b> (PHY)  <b>Christopher Galloway</b> (MAT/PHY)  <b>Armin Ghiam</b> (PHY)  <b>Brendan Keller</b> (PHY)  <b>Jonathan Langdon</b> (PHY)  <b>Kevin Lyons</b> (PHY/AST)  <b>Usman Mahmood</b> (PHY)  <b>Susan Moss</b> (PHY)(AST minor)  <b>Christopher Peltzer</b> (PHY)  <b>Ka Ho Poon</b> (PHY minor)</p> <p><b>August 2008</b>  <b>Giovanni Milione</b> (PHY)</p>	<p><b>Master's Degrees</b></p> <p><b>MA Degrees</b>  <b>August 2007</b>  <b>Stephan Albert</b>  <b>Christopher Malone</b>  <b>Benedikt Scharfenberger</b>  <b>Clint Young</b></p> <p><b>MSI Degree</b>  <b>William Anderson</b></p> <p><b>MA Degrees</b>  <b>December 2007</b>  <b>Constantinos Constantinou</b>  <b>Dominik Geissler</b>  <b>Daniel Greif</b>  <b>Lei Huang</b>  <b>Marija Kotur</b>  <b>Li Li</b>  <b>Jue Wang</b>  <b>Zhengwen Zhang</b></p>	<p><b>Master's Degree Candidates</b>  <b>MA Degrees</b>  <b>May 2008</b>  <b>Ioannis Iatrakais</b>  <b>Mohammad Atiquar Rahman</b></p> <p><b>MSI Degree</b>  <b>David Sproles</b></p>
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### August 2007 Ph.D.s

**Xin Chen** (Y. Deng) *Molecular Dynamics Modeling of a Biotoxin in Various Temperature and pH Environments*  
**Philip Colosimo** (L. DiMauro) *A Study of Wavelength Scaling of Strong-Field Optical Ionization*  
**Huishi Dong** (J. Hobbs) *Search for SM Higgs Boson in  $ZH \rightarrow \mu\mu + bb$  Channel in  $pp$  Collisions at  $\sqrt{s}=1.96\text{TeV}$*   
**Jae-Hyuk Her** (P. Stephens) *Ab initio Structure Determination from Powder Diffraction and Maximum Entropy image Reconstruction*  
**Kathryn Krycka** (C-C. Kao) *Understanding Thickness-Dependent Magnetic Properties of Ultra-Thin Films*  
**Kiyong Lee** (W. Siegel) *Covariant Quantization of the Superstring*  
**Xueqing Liu** (K. Likharev) *Electron Transport through Aluminum Oxide and OPE-based Molecular Junctions*  
**Sebastian Reyes** (A. Tselik) *Correlations in Low Dimensional Systems*  
**Carlos Trallero** (T. Weinacht) *Strong Field Coherent Control*  
**Ozgur Turel** (K. Likharev) *Devices and Circuits for Nanoelectronic Implementation of Artificial Neural Networks*  
**Wei Zhou** (V. Goldman) *Laughlin Quasiparticle Interferometer in the Quantum Hall Regime*

### December 2007 Ph.D.s

**Douglas Bennett** (J. Lukens) *Studies of Decoherence in of SQUID Qubits*  
**Haidong Feng** (W. Siegel) *Gauge Covariant Action from Strings*  
**Kerim Gulyuz** (G. Sprouse) *Cooling and Trapping of Rubidium and Francium Ions in a Linear Radio-Frequency Quadrupole Trap*  
**Radu Ionas** (M. Rocek) *Gravitons and Poncelet Polygons*  
**Jung Hoon Lee** (K. Likharev) *CMOL Crossnets as Defect-Tolerant Classifiers Bio-inspired (Neuromorphic) Computing Architecture for Defective Nanodevices*  
**Xialong Ma** (K. Likharev) *Global Reinforcement Training of Crossnet*  
**Shawn Pottorff** (J. Lukens) *Subgap Quasiparticle Transport and Low Frequency Critical Current Fluctuations in Nb/AlOx/Nb Josephson Junctions*  
**Ryan Terri** (C. Jung) *Measurement of  $\nu\mu$  Disappearance in the K2K Experiment with an Expanded Fiducial Volume at Super-Kamiokande*  
**Dmitri Volja** (W. Ku) *Realistic Theoretical Study of Long-Range Order in Half-doped Manganites*  
**Koon-Kiu Yan** (S. Maslov) *Studies on Biological Evolution and Biological Networks: A Statistical Physics Approach*

## May and August 2008 Ph.D. Candidates

- Tan Ahn** (G. Sprouse) *Evolution of the One-Quadrupole Phonon Mixed-Symmetry State in the A=40 Mass Region*
- Kieran Boyle** (A. Deshpande) *Double Helicity Asymmetry in Neutral and Charged Pion Production in Proton-Proton Collisions At  $\sqrt{s}+200$  GeV*
- Alin Costin** (G. Sprouse) *Structure Assignments to Excited States of Heavy Nuclei from Lifetime Information*
- Angeliki Field-Pollatou** (F. Walter) *The Initial Mass Function of Open Clusters in the Southern Hemisphere*
- Haijiang Gong** (A. Drees) *Indications for Thermal Radiation from Au+Au Collisions observed with the PHENIX Experiment at RHIC*
- Jeremy Holt** (G. Brown and T. Kuo) *Realistic Nuclear Interactions with Brown-Rho Scaling Medium Modifications*
- Bjorg Larson** (C. Jacobsen) *X-ray Spectromicroscopy Analysis and its Application to Bacterial Interactions in the Environment*
- Lai-Wa Siu** (T. Kuo) *Studies of Fermionic Systems near the Feshbach Resonance*
- Moustapha Thioye** (M. Rijssenbeek) *Topics in the Measurement of Electrons with the ATLAS Detector at the CERN Large Hadron Collider*
- Daniel Yohannes** (S. Tolpygo) *Process Development for High-Speed Superconductor Microelectronics for Digital and Mixed Signal Applications*
- Jinmi Yoon** (D. Peterson) *Rotation and Evolution of A and F Stars*

## More Graduate Achievements

- Kieran Boyle** RHIC & AGs Annual Users' Meeting Best Poster Award
- Torsten Dahms** NUPHA Young Scientist Award at Quark Matter 2008
- Jackie Faherty** American Museum of Natural History Graduate Student Fellowship
- Bryce Gadway** APS Leroy Apker Award
- Enrique Moreno-Mendez** ECT Doctoral Training Programme Fellowship
- Tatjana Vavilkin** IPAC Visiting Graduate Student Fellowship

## Where Are They Now?

**Carol Hall** PhD 1972 (G. Stell) is a Professor in the Dept. of Chemical and Biomolecular Engineering at North Carolina State University, and has been made a Fellow of the American Physical Society.

**Shaul Shaul** MA 1972 see letter on page 3.

**Michael R. Anastasio** MA 1973, PhD 1976, (Kuo) is the Director of Los Alamos National Laboratory.

**Bruce Porter** B.S. Physics 1973, is currently the optical specialist supporting Waters Corp.' line of spectrophotometers used in drug discovery.

**Keith L. Altman** B.S. Physics and B.S. Astronomy 1989 or 2008. Keith was cleared by Physics and by Astronomy to graduate in 1989, and didn't notice until much later that Stony Brook had not officially awarded the degree. That oversight is being corrected in Spring graduation, 2008. Mr. Altman is the Director of Adverse Event Analysis for the law firm of Finkelstein & Partners. In January 2008, he received a JD from Concord Law School. Finkelstein & Partners specializes in pharmaceutical litigation and Mr. Altman's specialty is analysis of pharmaceutical adverse events as well as general forensic data analysis. For many of the major pharmaceutical litigations such as FenPhen (diet drugs) and Hormone Therapy (Prempro) Mr. Altman designed the infrastructure for the management and review of millions of pages of documents and data. While at Stony Brook, Mr. Altman worked in Prof. Peter Koch's lab and developed software for data collection and data analysis. Those skills, as well as the general skills developed as a Physics/Astronomy major, have been very useful to him as much of his time is spent on the review of complex data which is scientific in nature. Furthermore, his scientific training has been useful interfacing with subject matter experts such as medical researchers, engineers, and financial experts.

**Nu Xu** PhD 1990 (Fossan) was elected Spokesperson of the STAR collaboration at RHIC.

**Lotfi Belkhir** MA 1989 (Peter Koch), PhD 1993 (Mohit Randeria and Jainendra Jain) is the founder and CEO of Kir-tas Technologies in Rochester, NY. They have developed the APT BookScan, the world's fastest automatic book scanner, and partner with Microsoft and a growing list of universities and organizations. Lotfi was Commencement Speaker at the department's ceremony in May 2007 and gave a moving account of his academic journey from his native Algeria to the United States, where he is achieving outstanding success.

**Fabian Essler** PhD 1993 (Siegel) is a Professor at Oxford University in the UK.

**Lorrie-Anne Mooney** (now Neiger) B.S. 1994 is the Chief Intellectual Property Counsel and Technology Licensing Manager of Brookhaven National Laboratory.

**Marya Doery** PhD 1995 (Bergeman/Metcalf) has worked in various software positions in Connecticut, and in the past year, in the Boston area. Finally, she has a position that is more or less what she likes with "Black Duck Software". She has also made some charming illustrations for a children's book. You can see her cover drawing at the following link: <http://www.thesquidkids.com/>.

**Ilari Maasilta** PhD 1998 (Goldman) has been appointed a Professor in the Department of Physics at the University of Jyväskylä, Finland.

**Kunal Das** PhD 2001 (Bergeman) is an Assistant Professor in the Physics Department at Fordham University.

**Yildirim Mutaf** PhD 2005 (Grannis) has accepted a faculty position at the Cancer Institute of University of Pittsburgh Medical Center.

**Kristian Rabenstein** 2005 (Averin) works at CITI Global Markets Inc. He has offered to meet our current students and talk about his experiences.

**David Ananikian** PhD 2006 (Bergeman) is working on Wall Street, most recently at Bear Stearns.



**Isaac Degani** (seated) participated in the MARIACHI workshop, and wrote a pattern recognition program to identify meteors based on spectrogram screen shots. His work earned him a place among the semi-finalists in the Intel Science Talent Search.

### The Women in Science and Engineering (WISE)

The WISE program, which is housed in the Physics Building, has received an award from the Long Island Fund for Women and Girls to start a role-model program at middle and high schools. The grant money will be used to train 10 or more Stony Brook students in leadership skills and to develop materials for sessions to be held in at least three area schools.

**Carrie-Ann Miller**  
Director of WISE  
Stony Brook



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STATE UNIVERSITY OF NEW YORK



**Jacqueline Schmidt** and **Srinivasa Arun Kumar Tadepalli**, winners of the Peter B. Kahn prize to recognize student commitment that enhances the activities of the department.

### Intel Science Talent Search

Excellent news! Of the forty finalists selected nationwide, five did their research at Stony Brook. Even better news! Two of the five worked with members of our department:

Hamsa Sridhar from Kings Park HS, worked with **Hal Metcalf** and **John Noé** on "A Novel Astigmatic Laser Mode Converter for Optical Vortex Tweezers"

David Rosengarten from Great Neck North HS, worked with **Martin Roczek** on his project "Rotation Curves in Five Dimensions". David ultimately placed 6th in this year's competition. Congratulations David!



WISE students **Elizabeth Hampton**, **Niya Grozeva**, **Manushi Shah** and **Kristin Horvath** with **John Noé** at the URECA Celebration (see page 6)