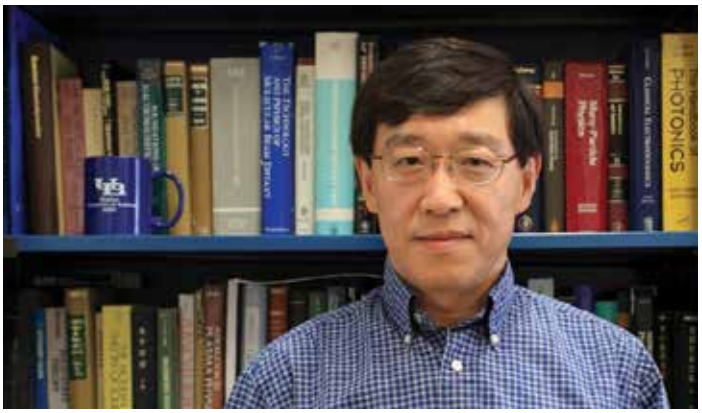
University at Buffalo The State University of New York | REACHING OTHERS

Interactions

The Newsletter of the UB Department of Physics

Volume 5, Issue 1 Fall 2012



Dear alumni and friends,

As many of you may know, the implementation of SUNY2020, which passed last year, is in full swing. Several University initiatives are focusing on growth and improvement. The newly appointed Provost, Dr. Charles F. Zukoski, who succeeded our own Interim Provost, Prof. McCombe, is fully on board with this process. SUNY2020 provides a great opportunity for us as a department to move forward. As one of the initiatives, we are among five departments currently in the process of establishing a Ph.D. program in Materials Science and Engineering. This year the Department is hiring a faculty member as part of this program. The additional resources will allow us to consolidate our strengths in several fields of research, taking advantage of the growth in the previous years. While exciting changes in the Department in the last 10 years have been abundantly clear to us, it is now increasingly reflected in perceptions outside the Department. For example, at the chair's retreat of the College of Arts and Sciences (CAS), before the start of this academic year, our Department was used as an example for growth with careful and well-planned use of University investments. Related to this, seven faculty members from the Department have been put on strategic planning committees at the College and the University levels this semester.

Looking back, the last academic year was an extremely successful one for the Department. Research output from the Department reached an all-time high, including the total number of publications from the Department, and total number of citations/year of the work published from the Department. In particular, the total number of students participating in publications and conference presentations reached yet another all-time high, with a 30% increase from a previous record the year before. Research expenditure is one of several factors that make it possible for increased research activity. The Department reached another record high in this category, continuing our trend set in recent years. This is in sharp contrast with this year's decrease in research expenditures for CAS that may be a reflection of the broader economic environment.

Several University and Department initiatives are in place specifically for undergraduate education. The University is making a great effort to increase the percentage of students who graduate in four years. For us, this was done with a significant number of class sections added this year, and correspondingly a roughly 20% increase in the number of teaching assistants in the Department, in addition to increased levels of academic advising. The University is also pushing to have departmental assessment plans for our undergraduate and graduate programs. Under the leadership of Professor Weinstein, our Director of Undergraduate Studies, a well-formulated plan is in place. In fact, CAS has distributed this plan to all departments in the College, to be used as a model. At the Department level, the Undergraduate Studies Committee has been modifying our curriculum and finding ways to offer more specialty courses to our majors. We reintroduced Optics and Electronics this year, after their absence for about two decades. The Department now has all introductory courses available online in the summer. This year's senior class is an exceptional one in many ways. There are 19 students in this class with an overall GPA greater than 3.4. Many of our seniors have been involved in research in various groups in the Department, and also outside UB through NSF Research Experience for Undergraduates (REU).

Again, a large number of well-deserved promotions took place this year in addition to several important awards and recognitions. Congratulations to Prof. Petrou for becoming a UB Distinguished Professor, Prof. Gasparini the Rustgi Professor, Profs. Hu and Wackeroth Full Professors, and Profs. Ganapathy and Stojkovic Associate Professors.

Cont. on page 7

Photo: Eckhard Krotscheck and his wife Friedel

Eckhard Krotscheck

by Dr. Francis Gasparini

Eckhard joined our Department in 2011 as a full professor. He is a distinguished many-body theorist who had previous appointments at Texas A&M University and Universität Linz. He is internationally recognized as one of the experts in strongly interacting quantum systems such as helium liquids, liquid mixtures, electrons and nuclear matter. His development of the correlated basis function method and Fermi hyper netted chain theory, and the application to strongly interacting systems, especially for inhomogeneous quantum fluids, was recognized with the 2007 Eugene Feenberg medal in many-body physics. Eckhard has been an APS Fellow since 1996 and has held the distinguished Heisenberg Fellowship. He has published extensively and is widely cited. In particular, he is also the editor and contributor of two books on many-body theory and application to quantum liquids in a confined geometry.

Microscopic Many-Particle Theory

Dr. Eckhard Krotscheck

The world around us consists, as we know, of many particles. Knowing this, how can we understand the behavior of the matter we see? Suppose all we know is how individual particles interact, is it possible to understand the features of macroscopic matter? To answer this question is the task of many-particle theory.

Among all many-body systems in condensed matter physics, the quantum fluids He-3 and He-4 are the most challenging ones: they are the only ones that remain liquids at low temperatures. This is a direct manifestation of the quantum nature of matter. Other surprising features have intrigued physicists for decades and it is indicative that four Nobel prizes have been given to researchers who advanced our understanding of how nature ticks through the understanding of the low temperature properties of helium.

When asked why one should be interested in helium, where immediate technical applications are not so obvious, one of my students responded “When

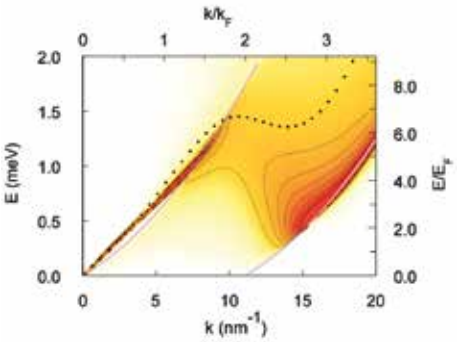


Photo: The figure shows theoretical results for the dynamic structure function of two-dimensional liquid He-3. Note the enhanced strength at a wave vector of 15 nm-1, energy of 0.5 meV. Exactly the same enhanced strength has been found in neutron scattering measurements off quasi-two-dimensional He-3. This result is one of the most beautiful examples of the power of modern microscopic many-body methods.

you want to build a good nutcracker, you have to try it out on the hardest nuts.” Using microscopic many-body methods we have in the past been able to predict, with quantitative accuracy, the energetics and structural properties of quantum fluids in various geometries. The reason for our success is that we have insisted on developing “robust” theory that can be applied, without modification, to a wide range of systems. One of the highlights of our recent work is the prediction of short-wavelength collective excitations in a Fermi fluid. Such excitations, where all particles move in unison, were so far believed to exist only at very long wavelengths. The effect was seen experimentally at practically the same time. (Nature **483**, 576–579 (2012)). Another highlight was the interpretation of so-called rotor excitations in solid He-4 (Phys. Rev. Lett. **107**, 265301 (2011)) in an energy-momentum regime where no such excitations should exist; the work sheds light on the intriguing effect of “super solidity.”

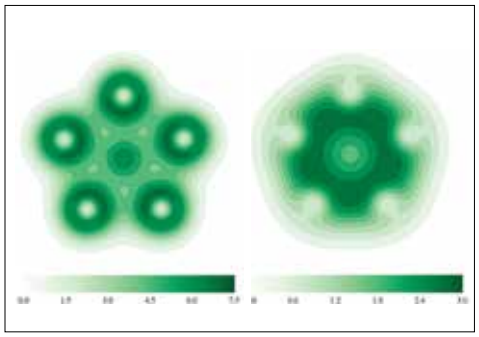


Photo: The two figures compare the electron density of a Mg_7 (left) and a Na_7 (right) clusters. Dark green areas depict high electron density. Although the ionic configuration of the two clusters is almost identical, the electrons in the Na cluster are delocalized, indicating that even such small metal particles are metallic. The electrons in the Mg cluster are, on the other hand, strongly localized. At what particle number Mg clusters will eventually undergo an insulator to metal transition is still not clear.

Work on quantum fluids is not over; new measurements are presently performed at the Institut Laue Langevin in Grenoble and at Oak Ridge National Laboratory. In these experiments, the features of high-energy and short-wavelength these experiments, the features of high-energy and short-wavelength excitations in both liquid and solid He-3 and He-4, are examined and the, first preliminary results indicate that the experimental data agree quite well with our theoretical predictions. Further work, looking at spin excitations in fermions, in particular are being planned.

Banner: Students wearing their physics thinking hats at the Department’s holiday party in December 2012.
Photo: Dr. Andrea Markelz

A second line of research is computationally oriented. As the power of computers increases, one can develop algorithms that could not have been implemented a few years ago. This is distinctly different from just doing more calculations in a shorter time. We have developed a completely new method for dealing with the Kohn-Sham equations of density functional theory that is formulated entirely in coordinate space and thus avoids modeling uncertainties inherent to basis set expansions. Applications of our work include the study of structural properties of small metal clusters, in particular whether one can find a phase transition from a conducting to an insulating system. Further work will turn to dynamic features. We also are interested in stimulating the reaction of metal clusters in strong laser fields and looking at the behavior of nuclei in the field of strong, MeV lasers that are currently being planned.

Photo: Dr. Brink teaching graduate students English

Professor Gilbert O. Brink

By Dr. John T. Ho

Professor Gilbert O. Brink passed away on April 9, 2012 at age 82. Gil was born in 1930. His father was one of the last hard-rock gold miners in California. Until he was 13, Gil lived in a one-room cabin with outdoor plumbing and a wood stove for heat. He later moved to Stockton, CA, where his parents worked in a shipyard. Gil contracted polio as a teenager and spent more than a year in the hospital. His left leg was paralyzed and his right leg had lost 90% of its normal strength. With fortitude and perseverance, he was able to walk with the help of a long leg brace and crutches for more than 50 years before he had to use a wheelchair.

Gil's handicap did not deter him from pursuing his childhood dream to become a scientist. He eventually enrolled in the University of California, Berkeley, and received his PhD in Chemistry in 1957.

After graduation, Gil worked first at the Lawrence Berkeley Laboratory and later at the Cornell Aeronautical Laboratory in Buffalo before becoming a faculty member in the Department of Physics at UB in 1968. His research interest was in experimental atomic and molecular physics, and he developed novel techniques to study the interaction between molecular beams and coherent photons from a laser. Gil was also a masterful designer of scientific instruments for teaching and research. The optical pumping experiment that he first built for the Advanced Laboratory at UB and later modified and made available to various academic institutions through Teach Spin, Inc. is an exquisite example of his creativity. Gil also served as Department Chair in the early 70's and was instrumental in the establishment of the astronomical observatory in Fronczak Hall. After his retirement in 1995, Gil remained active in the community. As a literary volunteer for International students, he coached them to improve their English at the Amherst Senior Center. He also helped clients with handicaps or dementia and taught an astronomy course. From his adapted van, he even volunteered for Meals on Wheels. In 2006, Gil was recognized for his various services to the community and received the prestigious Jefferson Award sponsored by the Buffalo News and WNED-TV.

Professor Mendel Sachs

By Dr. Francis Gasparini

We are sad to report that Professor Emeritus Mendel Sachs passed away on May 5, 2012. Mendel had been a member of our Department since 1966, and retired in 1997. Prior to joining UB, Mendel had been on the faculty at San Jose State in California, McGill University in Montreal and Boston University. Mendel had many interests; he liked to describe himself as a theoretical physicist and philosopher of physics. Principally, his research was in general relativity and its relationship to cosmology, astrophysics and particle physics. He prided himself in his eclectic outlook on these fields and liked to follow his own instincts. In one of his many colloquia in the Department he came to the

Photo: Dr. Mendel Sachs

podium with a prop of a bubble-head rhinoceros. This kept the audience wondering until the very end. He then proceeded to explain that physicists are often like a herd of rhinoceros, which are almost blind animals, who just wait around until someone makes a move, and then they all stampede in unison, even if there is no apparent reason. Mendel was not one to follow the herd. After retirement Mendel gave a colloquium in the Department in 2008, and it was good to see that his independent spirit continued to be very much alive. We will remember him fondly.

We extend our condolences to all members of his family, his children and extended family, but in particular to his wife Yetty, whom many of us remember as a gracious hostess and Mendel's constant and loving companion.

Banner: Undergraduate Commencement Spring 2012.
Photo: Dr. John Cerne

2012 Rustgi Memorial Lecture

By Dr. Richard Gonsalves

The eighteenth annual Moti Lal Rustgi Memorial Lecture was delivered by famed NASA astrophysicist and 2006 Nobel Laureate in Physics Dr. John C. Mather on April 20. The lecture entitled ``History of the universe in a nutshell: from the Big Bang to life and the end of time'' enthralled the audience of more than 300. This story of the discovery of cosmic microwave background radiation-the afterglow of the Big Bang-and its detailed characterization by NASA's Cosmic Background Explorer Mission on which Dr. Mather served as Project Scientist and for which he shared the Nobel Prize. Dr. Mather then described the James Webb Space Telescope (JWST) project, on which he has served as Senior Project Scientist since 1995. The infrared telescope with a 6.5 meter diameter primary mirror, a sunshield as large as a tennis court, and four sophisticated cameras and spectrographs, is scheduled to be launched in 2018 to orbit around the L2 Lagrange point 1.5 million kilometers from Earth away from the Sun. The observatory will gather infrared data from the oldest galaxies and the faintest observable stars and planetary systems over its 5-10 year mission. The data is expected to provide answers to fundamental questions about the origin of the Universe, the chemical elements, and life on Earth. Dr. Mather's vivid and insightful descriptions of physics and technology were supplemented by stunning NASA images and a fascinating movie simulating the intricate deployment sequence of the sunshield and mirror from the launch capsule at its final L2 destination.

There were numerous opportunities Thursday evening and all day Friday for Dr. Mather to meet individually and in small group sessions with visitors to UB, students, and faculty. Members of the audience queued up after the lecture to chat individually with Dr. Mather, many of them asking him to autograph their copy of the one-page lecture handout with basic facts about the JWST, its purpose, and its technology. Undergraduate physics majors and members of the local SPS Chapter met with Dr. Mather for an hour-long informal discussion session at 11 am on Friday. After a brief biographical self-introduction, Dr. Mather was peppered with a range of questions about physics, NASA programs and funding, smart career choices, and the life of a scientist in general. He offered advice on hot fields for graduate study now and in the future, how to ace the GRE (which he did as an undergraduate at Swarthmore in 1968), how to choose a research advisor and what to do if you are unhappy with your choice, and industry versus academia in looking for a job. A recurring theme in his remarks was the importance of having fun in school, in research, and in collaborative ventures.

Dr. Mather and undergraduate physics majors. Photo: Dr. John Cerne

The Moti Lal Rustgi lecture series started 18 years to honor Professor Rustgi. Dr. Rustgi was a faculty member in the Department from 1966 until his untimely death in 1992. His family established the Rustgi Memorial Lectureship, and later the Rustgi Professorship, in his memory. Their foresight and generosity have enabled the Department to present this annual series of public lectures by distinguished scientists on exciting developments in physics. Dr. Mather is the seventh Nobel Laureate to deliver a Rustgi Lecture. The visit concluded with Dr. and Mrs. Om Rustgi joining Dr. Mather and a group of physics faculty for dinner, following which the Rustgis treated Dr. Mather to a drive to Niagara Falls and its festive nighttime illumination. For more information, including an audio recording of the lecture, photos, and a poster, please visit the Rustgi Lecture website at http://www.physics.buffalo.edu/talks/Rustgi/2012/

Buffalo Public Schools

By Dr. Dejan Stojkovic and Chase Ellis

For the past year the Department of Physics at UB has been actively involved in a project aiming to stimulate new and innovative ways to teach science in Buffalo public schools. This work is part of Buffalo's new Interdisciplinary Science and Engineering Partnership (ISEP) between UB, Buffalo Public Schools, Buffalo State College, and the Buffalo Museum of Science. The program recently received a grant from the National Science Foundation, which will provide Buffalo middle schools, high schools, UB graduate students, and UB faculty with the resources necessary to collaboratively develop new lesson plans, demonstrations, and experiments for Buffalo public school classrooms.

Last November, Chase Ellis and Dr. Dejan Stojkovic, of the Department of Physics, worked together to prepare a workshop for Buffalo Earth Science teachers. The purpose of the workshop was to integrate solar weather and its effects on the Earth's climate into Earth Science classes. The workshop is based on two experiments that

Banner: Dr. John Mather delivers this year's Rustgi Lecture.
Photo: Dr. John Cerne

would allow students to monitor and observe solar activity and weather.

The first experiment focused on the observation of sunspots on the Sun's surface. Tracking sunspots serves as a powerful tool for monitoring solar activity, since most solar flares and coronal mass ejections (CMEs) emanate from sunspot regions. Every teacher participating in the workshop was given a small solar telescope for their classroom that would allow students to safely observe and monitor sunspots. Following the tradition of Galileo Galilei and others, students will use the telescopes to draw the structure of sunspots and track their position day by day so that the rotational speed of the sun can be calculated. For those cloudy days in Buffalo, students can download images of the sun from NASA's Solar and Heliospheric Observatory.

The second experiment enables students to observe fluctuations of Earth's magnetic field caused by interactions with energetic charged particles that emanate from solar flares and CMEs. This is achieved by building a simple, ultra-sensitive magnetometer (basically a fancy compass). The magnetometer consists of a recycled 2-Liter soda bottle that has a rare earth bar magnet suspended from a thread inside of it. A small mirror is glued onto the magnet so that a laser beam can be reflected off it and onto a wall. During a solar storm, the Earth's magnetic field will be affected temporarily. These fluctuations in the magnetic field yield changes in the deflection of the bar magnet and the reflected laser beam, which enable students to measure very small changes in the Earth's magnetic field due to solar storms. The students can then compare their data with data from magnetometers that have been setup all over the world by the USGS's National Geomagnetism Program. Both of these experiments are designed to give students hands on experience with solar weather and its effects on the Earth.

ISEP has also enabled Chase Ellis and Dr. John Cerne to work with three teachers from Buffalo's Hutchinson Central Technical High School to start up a team of students that will participate in the upcoming New York State Science Olympiad. The group will be working with students to teach them the skills needed to fabricate and optimize rubber band launched gliders, balsa wood bridges, and magnetically levitated cars.

Outreach

Science Days

By Justin Perron

On June 6th UB hosted the first of many "Science Day" outreach events. These events are the result of collaboration among graduate students from the Physics, Chemistry and Biology Departments at UB. Through the support of a New York State Section of the American Physical Society outreach grant as well as support from the Physics and Biology Departments, graduate students hosted the event, which consisted of various science-based activities for participants to perform. Support from the Interdisciplinary Science and Engineering Partnership (ISEP) provided transportation for a group of 7th and 8th graders from the Dr. Charles R. Drew Science Magnet School in Buffalo to UB's campus. While on campus the students made their own ice cream and artwork with grad students from chemistry, examined cheek cells and discussed evolutionary adaptations (including very intimate interactions involving some exotic snakes) with biology graduate students, and identified various elements using optical spectroscopy as well as explored the physics of cold using liquid nitrogen with the physics graduate students.

A student experiments with quantum levitation Photo: Chase Ellis

Students used optical spectroscopy to identify elements. Photo: Chase Ellis

One notable point about the Science Day initiative is that it is entirely student run. From inception to acquiring funding to implementation of the event all the work was performed by UB graduate students. The success of the event was due to the students' hard work and passion. That being said the event could never have happened without the support of the Physics Department staff and faculty, nor without the previously mentioned financial support. The ultimate goal of these events is to increase interest in the sciences among students from communities that are traditionally underrepresented in these fields. After the success of this premier event and with enough funding to host monthly events through

Banner: Hutch Tech teacher, Robert Merkle finds out how much weight his bridge can hold while others work on balsa gliders. *Photo: Chase Ellis*

the next academic year, the program seems poised to do just that. For more information regarding the program contact George Lindberg at gpl2@buffalo.edu.

Students learning about snakes and different genetic mutations at an outreach event

ISEP and STEM

By Thomas Scrace

During this past school year I had the opportunity to take part in the Interdisciplinary Science and Engineering Partnership (ISEP) with the UB, Buffalo Public Schools, Buffalo State College and the Buffalo Museum of Science. This NSF grant was brought to UB by chemistry professor, Dr. Joseph Gardella. Last September I was assigned to Buffalo Public School #59, the Dr. Charles R. Drew School of Science, to help promote Science, Technology, Engineering, and Math (STEM) education.

At School #59, I was assigned to the school's science coach, Amy Brackenridge. As science coach, Amy is in charge of overseeing the science education at all grade levels, as well as teaching the Regent's living environment class to 8th graders. I spent 5 days per week at the school working with students in all different grade levels. Amy and I spent the first few days brainstorming different ways to improve STEM education in the school. Luckily for us, the school is attached to the Buffalo Museum of Science, giving us an invaluable tool in promoting STEM education.

During my time at the school I worked with the teachers and students in the Regent's living environment class, the Regent's algebra class, the 7th grade physical science class, and with 4th graders on their lab knowledge for improving statewide tests at the end of the year. Amy and I set up a Science Learning Center for the 4th graders, where they learned about very basic lab activities and many of the students found these activities difficult. With the help of UB undergraduate T. A. Krista Coleman, and the other UB undergrads assigned to work at the school, we were able to meet with the 4th graders twice a week to better their understanding of how to read a ruler or use a balance.

This is one of our many ISEP funded field trips. Here we are at the Buffalo Zoo. This is the regents living environment class and the girl on the far right is Kelsey Russo, an undergraduate from UB who worked at school #59.

I also participated in many activities outside of the classroom. I had the privilege of working closely with students in activities such as Time Warner's "Wouldn't it be Cool If?", a competition at the Buffalo Museum of Science, the afterschool Robotics program run by engineering students at UB, and two different STEM days where the students came to UB to learn about the importance of science and how much fun it can be at the same time.

I am very thankful for the opportunity to work with Amy and School #59. None of the field trips and competitions would have been possible without the ISEP partnership. Students greatly benefitted from the extra school supplies and lab equipment they received from the grant. I learned a great deal this past year and have seen first hand the importance of STEM education in our public school system. At least for the Buffalo Public Schools, this is one step in the right direction and it is all possible thanks to Dr. Joseph Gardella and all of those who worked tirelessly to get the grant to help fund the ISEP partnership.

Along with Tom, two other Physics students, Nicholas DeMeglio and James Parry, participated in this program, along with other graduate students from different departments.

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Banner: Dr. Rappoccio at the Science and Art Cabaret at the Ninth Ward at Babeville. Dr. Rappoccio joined the Department in Fall 2012.

Research News

Marko Jaric Award

By Dr. Dejan Stojkovic

On March 16, 2012, Dr. Dejan Stojkovic was awarded with the "Marko Jaric" award for outstanding achievements in physics. This is the most prestigious award usually given to scientists of Serbian origin, and is popularly known as the "Serbian Nobel Prize." Marko Jaric was a very successful Serbian scientist who lived and worked in the US. After his untimely death in 1997, several institutions (Institute of Physics, Department of Physics, Serbian Academy of Science, and Serbian Unity Congress) together with Jaric family established an annual award which is given to a scientist (or a group of scientists) of Serbian origin for outstanding achievements in physics. The list of previous winners can be found here https://wiki.physics.udel.edu/ssd/Recipints_of_Marko_V._Jaric_Award.

Dr. Stojkovic, third from left, receiving his award from Zarko Obradovic, Serbian Minister of Science and Education.

Dr. Dejan Stojkovic received the Award from the Serbian Minister of Science, at a special ceremony held at the Rectorat of the University of Belgrade. He gave a talk about his research in front of a very distinguished audience, which included renowned scientists, educators, city mayors, high ranking politicians and journalists. As a part of his visit, he gave several scientific and popular talks at the major universities in the region. Link to the Marko Jaric Fund (Serbian) http://www.fondjaric.rs/.

Award Announcement by SEENT network (English) http://www.seenet-mtp.info/news/prof-dr-dejan-stojkovic-received-prize-marko-jaric. Award Announcement by Astronomy Magazine (Serbian) http://www.astronomija.co.rs/vesti/5564-prof-stojkovi-dobio-nagradu-qmarko-jariq.html.

Awards and Grants

Francis Gasparini—NSF for three years, starting Aug. 1, 2011. Total funds $360K. The grant title is "Weak coupling effects in Helium-4"

Igor Zutic—was involved in a multi-university team effort (PI: Roland Kawakami, University of California, Riverside, Co-PIs: Lu Sham, University of California, San Diego, Igor Zutic, University at Buffalo, Ilya Kirvorotov, University at California, Irvine, Hanan Dery, University of Rochester), that was supported by National Science Foundation and Semiconductor Research Corporation. The award "Nanoelectronics Beyond 2020: Developing a Graphene Spin Computer: Materials, Devices, Modeling, and Circuit Design," was among 12 that were given. The budget for the subcontract to UB is $236,800 from 9/2011-2/2015.

Arnd Pralle—was awarded a Research Grant from the Human Frontier Science Program. It is a 3-year award for 4 groups with Dr. Pralle as PI and 3 Co-PIs (for a total of $1.2 Million). HFSP emphasizes interdisciplinary, international collaborations. Dr. Pralle's collaborators are a neurobiologist in Japan, a chemist in Germany (Marburg) and a microbiologist in Germany (Munich). The group in Munich is using bacteria to make protein coated magnetic nano particles, while the group in Marburg either synthesizes NPs or coats the ones from Munich. They combine these with self-assembly on cells to create local fast heaters, which open ion-channels in neurons, and the group in Japan then tests these in brain slices to see how to influence complex signaling.

Cont. page 8

Events Calendar

May 11	Graduate Commencement
May 13	Undergraduate Commencement
June 4	Transit of Venus
June 6	Science Days
Aug 20	Diagnostic Exam
Aug 21-23	Qualifying Exam
Aug 21	New Student Advisement
Aug 24	New Student Orientation and Welcome BBQ
Aug 27	First day of classes
Oct 20	Open House Cabaret
Nov 21-23	Fall Recess
Dec 5	Higgsfest
Dec 8	Dept. Holiday Party

Chair's Letter
Con't. from page 1

Prof. Stojkovic received the Marko Jaric Award, selected among a group of renowned physicists worldwide. Prof. Zheng, the newest member of our long list of NSF CAREER Award winners, received a UB Exceptional Scholar-Young Investigator Award. A special issue of Low Temperature Physics is dedicated to the celebration of Prof. Gasparini's 70th birthday. This is a rare but fitting recognition of his outstanding

Recent graduate Justin Perron, his bride Lindsay Swensen (UB Law), and fellow UB physicists in Buffalo at their wedding in August 2012. *Photo: Chase Ellis*

accomplishments. Prof. Krotscheck also organized a symposium to celebrate this occasion. Along this line, I would like to mention that our alumnus and staunch supporter of our Department, Dr. Norman Jarosik at Princeton University, received the prestigious Gruber Foundation's Cosmology Prize this year. We also have an addition to our faculty, with Prof. Rappoccio joining the Department in July, as an Assistant Professor specializing in experimental high energy physics.

On a completely different note, we lost two of our retired faculty members, with whom many of you are familiar. Professor Brink passed away on April 9, 2012 and Professor Sachs passed away on May 5, 2012. Their legacies will be remembered.

We will be publishing the Newsletter yearly in the fall starting this academic year. Our goal is to focus on important developments in the Department, so that you will be well informed.

Keep in touch and let us know how things are going with you!

Best regards,

Hong Luo, Chair
Professor of Physics

Honoring Professor Francis Gasparini

By Mr. Stephen Thomson

Leading physicists in the Low Temperature physics community came to UB on October 6-7, 2012 for the festival/workshop honoring Dr. Francis M. Gasparini. Dr. Gasparini has been working at UB for 39 years, and during this time has received numerous awards for his teaching and research contributions to the University. To name only a few, Dr. Gasparini became a Fellow of the American Physical Society in 1990, received the SUNY Chancellor Award for Excellence in Teaching in 1996, was honored as a UB Distinguished Professor in 2007, and currently holds the Rustgi Professorship, which honors a professor for his/her contribution to research and education. He held the position of Chair of the UB Physics Department for six years (two terms, from 2004-2010) and during that time, the Department expanded and flourished. In addition to being honored for these contributions at the festival, the Low Temperature physics community came together and put together a special Journal of Low Temperature Physics issue, coming out this November (2012), in his honor.

The workshop was initiated and funded by our own Dr. Eckhard Krotscheck, who enlisted the help of Christine Gleason and Joseph Murphy for organizing of festival.

Some of the attendees of Frankfest gather for a group picture Photo: Chase Ellis

Dr. Dan Finotello recounting a humorous story of being Dr. Gasparini's graduate student Photo: Chase Ellis

Cont. from page 7 Awards and Grants

In October 2012, UB Professor Surajit Sen was named an AAAS fellow. AAAS fellows are recognized for their outstanding contributions to science and technology.

In a December 2012 UB Spectrum article, our own Dr. Kinney was named among the top ten professors at UB. Congratulations Drs. Sen and Kinney!

Banner: Prospective students touring the Physics Labs at Fall Open House.
Photo: George Lindberg

The scientific program featured 15 talks selected to promote discussion and collaboration. The lecture sessions were held in an informal atmosphere to promote the exchange of ideas between investigators and researchers who may be in different fields of study. A celebratory dinner was also held, where UB alumnus and former graduate student of Dr. Gasparini, Dr. Dan Finotello, put into words the respect and admiration for Dr. Gasparini so many of us have. By his students, Dr. Gasparini was at one point jokingly known as Dr. Death because of how difficult his classes are. Students respect his deep and thorough knowledge of thermodynamics which is clearly evident when taking his class. Frankfest was a resounding success, and Dr. Krotscheck hopes that this, and future workshops, will "add some international visibility to the Department," adding that honoring Dr. Gasparini was "an appropriate kickoff to the series of workshops." The workshop series should soon have a logo and website, and proposals from faculty are encouraged. Dr. Krotscheck and Dr. Gasparini have already successfully arranged for the International Symposium of Quantum Fluids and Solids to be hosted by UB in 2015. This is yet another example of Dr. Gasparini's promotion of the Department, and is another reason why honoring him with the festival was fitting.

As Dr. McCombe says, "[Dr. Gasparini] is one of the few people in the world who truly understands thermodynamics," and having a low temperature physics workshop in his honor was a very appropriate tribute. Look for more exciting research from Dr. Gasparini as he is still driven to understand low temperature phenomena, since, as he says "there is nothing quite like the high of getting new data."

New Staff

By Christine Gleason

The Physics Department welcomed three new staff members in spring of 2012. Nicole Mercer is the Department's new Assistant to the Chair. Nicole is responsible in part for hiring our new Graduate and Undergraduate Secretaries Yvette Pardee and Jessica Smith.

Nicole is a 1997 graduate of UB where she received a Bachelor of Arts Degree with a dual major in Psychology and Sociology. After graduating, she worked for the Research Foundation at UB's Research Institute on Addictions in Buffalo, NY for years on multiple federally funded grants as a Project Coordinator. Prior to working for the Physics Department, Nicole completed a three year research project on Pregnancy and Health, a longitudinal follow-up study with pregnant women seeking smoking cessation treatment. Nicole has had a number of publications in prestigious addictions journals such as Addictive Behaviors and has given numerous professional presentations in the area of Dual Diagnosis (Co-morbid Severe Mental Illness and Substance Dependence) at national conferences.

Nicole has been an active volunteer for the American Cancer Society for the past ten years and has chaired one of the local Relay for Life events for several years. Through her fundraising efforts, the Relay for Life has raised over $1 million while under her direction. She sits on the Board of Directors for the Crusade Against Impaired Driving, which teaches teenagers about the dangers of impaired driving – while drinking or texting. Nicole also volunteers for Kids Escaping Drugs.

Our new Graduate Secretary is Yvette Pardee. Yvette is a 2006 graduate of UB with a Bachelor of Arts in Communication in the only graduating class from the School of Informatics. Yvette also has an Associate Degree in Applied Science from Niagara County Community College in business (Information Processing Specialist). She started working at UB in 1999, most recently as the Graduate Admissions Secretary in the Department of Computer Science and Engineering.

Yvette enjoys riding her motorcycle, going to car/bike shows, sporting events, taking care of her miniature longhaired dachshunds, creating authentic Native American beadwork items, reading and traveling.

Jessica Smith, is our new Undergraduate Secretary. Jessica earned her Bachelor of Science degree in Speech-Language Pathology from Buffalo State College in 2009. After college and before beginning her position in Physics, Jessica worked in the private sector.

Jessica likes to read non-fiction books, watch movies, go to the gym, spend time with friends and play with Jack, her cat.

The Physics Department is very happy to have each of these bright, successful women and is looking forward to a long successful relationship with all of them.

Banner: Our new staff - left to right, Jessica Smith, Nicole Mercer, and Yvette Pardee.
Photo: Joseph Murphy

We Congratulate Our Graduates

BACHELORS

Physics Spring 2012

Ayoub, Nadine
Brosius, Richard Loren
Cavalcanti, Victor Tenorio
Dutter, Steven John
Filipski, Daniel Gregory
Kwan, Chun Pui
Mercer, John
Pineros, William David
Spoth, Katherine Anne
Wick, Patrick John

Mathematical Physics Spring 2012

Edgington, Travis
Grisafi, Steven

Engineering Physics Spring 2012

Donhauser, Brian

Physics Minors

McGreevy, John
Mok, Jorge

MASTERS

Physics Fall 2011

Shipkowski, Simon P

Ph.D.

Physics Fall 2011

Hafner, Jeffery P.
Advisor
Wenjun Zheng
Thesis Title
Validation and Refinement of Coarse-Grained Protein Dynamics Modeling

Physics Spring 2012

Kim, Minsoo
Advisor
Sambandamurth Ganapathy
Thesis Title
Transport behavior across the field-driven superconductor-Insulator Transition in 2D films

Kopwitthaya, Atcha
Advisor
Dr. Paras N. Prasad
Thesis Title
Magnetoplasmonic nanostructures for biological applications

Poltis, Robert Vincent
Advisor
Dejan Stojkovic
Thesis Title
Observational Evidence of New Physics from higher dimensional electrowliak vacuum and optical polarization of quasar light

Physics Summer 2012

Perron, Justin
Advisor
Francis Gasparini
Thesis Title
Critical Point Coupling in Confined Liquid 4He Near the Superfluid Transition

Shih, Bi-Ching
Advisor
Peihong Zhang
Thesis Title
Screened Coulomb Interaction of Localized Electrons in Solids

Stabile, Adam
Advisor
Sambandamurth Ganapathy
Thesis Title
Temperature and Electric Field Effects Across the Metal-Insulator Transition in Nanoscale Vanadium Oxide Systems

Subramanian, Hemachander
Advisor
Jong Han
Thesis Title
Interaction of magnetism with atomic lattice geometry and nanoscale geometric frustration

Mustafa Tekpinar
Advisor
Wenjun Zheng
Thesis Title
Investigating conformational transitions of proteins by coarse-grained elastic network models

Outstanding TA

Bipob Barman
Rem Tsai

Certificate of Honorable UB-wide Graduate School's Excellence in Teaching

Heng Haung

Banner: Santa George telling tales of wonderful holiday data, at the Department's December 2012 holiday party.
Photo: Dr. Andrea Markelz

Development

Support the Department of Physics Programs

The Physics Department is grateful to all our alumni and friends for their financial contributions. These contributions provide the margin which makes UB Physics an excellent Department. In today's environment of decreasing government support, the contributions to any of these funds are instrumental in the quality of our academic endeavors every year. To contribute electronically, please visit www.physics.buffalo.edu and click the Support Physics button on the top right or contact Chris Gleason in the Physics Department at 716-645-3629 or via e-mail cg57@buffalo.edu. You may also contact the Development Office at 716-645-0839, with any questions.

Physics Department Funds:

Physics Excellence Endowment:
The Physics Excellence Endowment is of paramount importance in achieving overall excellence in the broad mission of the Physics Department. These expendable, undesignated funds support recruitment of outstanding graduate and undergraduate students, outreach efforts to the community, upper level experimental laboratories, undergraduate research projects, and activities of The Society for Physics Students. In addition, the Physics Excellence Endowment funds provide partial support for the Department's colloquium and seminars series, and for the tangible recognition of our outstanding faculty and students.

Frank B. Silvestro Endowment Fund: This endowment, established in 2000, and funded by donations of Mr. Frank Silvestro, BA 1962, MA 1968 is used to support physics students who show academic promise and demonstrate financial need. Currently, the available endowment funds are used for the support of graduate students.

Dr. Stanley T. Sekula Memorial Scholarship Fund:
This endowment, established in 1990 by Mrs. Anne H. Sekula, honors the memory of Dr. Stanley T. Sekula, BA 1951. The endowment income is used to recognize outstanding undergraduates who show academic promise and demonstrate financial need.

Moti Lal Rustgi Professorship in Physics:
Endowed by the Rustgi family in 2006 to honor the late Professor Moti Lal Rustgi. Provides support for the Rustgi Professor, currently held by Professor Francis Gasparini.

Moti Lal Rustgi Memorial Lectureship Fund:
Established in 1993 by the Rustgi family, the fund supports an annual lecture by distinguished researchers.

Ta-You Wu Lectureship Fund:
Established in 2008 by Professor Yung-Chang Lee in remembrance of the late Professor Ta-You Wu, who was a key member of the Department from 1966 to 1978.

Physics & Arts Exhibition Fund:
This interactive permanent exhibition in Fronczak Hall opened in 2006, and was funded by alumni. It is one of the Department's most effective outreach initiatives. Support will allow continued evolution and development.

Physics International Graduate Student Assistance Fund:
Established in 2010 by Professor Bruce D. McCombe to provide support for critical financial assistance to international graduate students in the Department of Physics, with a preference given to Asian students and 1st year Ph.D. candidates, at UB.

Banner: From left, Drs. Krotscheck, Zeng, Ho, Finotello, Luo and more enjoying some drinks before dinner, at Frankfest. *Photo: Chase Ellis*

The University at Buffalo Department of Physics Newsletter

The picture on the right of the Sun with the planet Venus in the lower right corner was taken during this year's Venus transit on June 5. The picture was taken through the Department's 6 inch Orion telescope. Approximately 30 people came to the event. On the left is our own Dr. Weinstein looking through the telescope.
Photos: Dr. John Cerne and George Lindberg

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