

Department of Physics and Astronomy Newsletter

Spring Semester

State University of New York, Stony Brook

1999

Stony Brook in Atlanta...

Our department was very well represented at the Centennial Meeting. Profs. **C.N. Yang** and **Barry McCoy** spoke at the session honoring prize winners (C.N. Yang received the Onsager Prize and gave a talk on *Sound Velocity in Bose Condensate*; Barry McCoy shared in the Danie Heineman Prize and gave a talk on *Integrable Models in Statistical Mechanics: The Hidden Field with Unsolved Problems*).

Prof. **Laszlo Mihaly** gave one of the featured Display Talks on the *Structure and Electronic Properties of Fullerenes*.

Other invited talks were presented by Profs. **Phil Allen** on *Diffusions, Locomotion, Propagons: Zoology of Atomic Vibrations in Glasses*; **Alfred Goldhaber** on *Gertrude Scharff Goldhaber: Her Life With Physics*; **Doug Swesty** on *Modeling Neutron Star Mergers on High Performance Parallel Architectures*; **Ralph Wijers** on *Gamma Ray Burst Afterglows: Fire from Relativistic Supernovae*. And recently minted Ph.D., Dr. **Goetz Bendele** (former student of Prof. Peter Stephens) on the *Effect of Charge State on Fullerene Polymerization...*

...and elsewhere...

Prof. **Chang Kee Jung** is presenting an invited plenary talk at the International Europhysics Conference in Tampere, Finland on Neutrino Masses and Oscillations in July; Prof. **Ralph Wijers** gave the summary talk at the conference on Gamma ray bursts: *The First Three Minutes*, in Oestersund, Sweden in February, and an invited review at the conference on gamma ray bursts in Santa Barbara in March; Prof. **George Sterman** presented an invited plenary talk on *Recent Progress in QCD* at the APS Division of Particles and Fields Meeting at UCLA in January.

Edward Shuryak has been appointed as a member of the Nuclear Science Advisory Committee.

SBPhysics & Astronomy is #9!

The November/December '98 issue of Science Watch presented a rating of the top science departments at US universities as measured by citation impact for the period 1993-97. The leaders in this report were: UCSB, Chicago, Harvard, Caltech, Yale, Rutgers, Penn, Stanford, Stony Brook and Michigan State in that order. Good to see another objective analysis placing us among the top 10!

Plan to attend the
department
alumni meeting

June 16-18, 2000

Physics and Astronomy for
the Next Millennium

(see fall99 NewsLetter
for details)

New Optics Center

Thanks to generous gifts (totaling \$105,000) from the Swartz Foundation, Olympus Corporation, Dr. **James Simmons**, and Symbol Technologies, the Department of Physics and Astronomy has constructed and begun to equip a new Optics and Laser Teaching Center to address the demand for college graduates in this field.

Under the direction of Prof. **Harold Metcalf**, the center will provide a vital link between education and industry. Optics encompasses a broad set of technologies and techniques for exploiting the properties of light; its applications are widespread in research labs, engineering and physics departments, and medical schools. The center's principal purpose is to address a broad range of teaching opportunities that may include classroom and lecture demonstrations or establishment of a hands-on museum-like instructional center. Conveniently housed in the basement of the Physics Building, the center will be available for faculty demonstrations in a variety of courses aimed at optics-related projects. Industry-driven research initiatives and specialized tasks will also be a part of the center's function.

"The activities at the center will really be student-focused for student projects," Metcalf noted. "I expect these activities will continue to flourish in this environment where they now have a home. Student projects encompass all kinds of different phenomena that are engaging and fascinating to them. When students are attracted that way to a project, they really seek to learn more and more about it; these students are running away in their subject matter, coming into the lab at all hours of the night."

SB High Energy Physics Working with High-School Teachers

The department high-energy particle physics group has been accepted as one of twelve groups receiving NSF support to sponsor two local high-school teachers in an 8-week summer research program called QuarkNet. The summer program consists of a 1-week training and orientation program at Fermilab, followed by 7 weeks of research in particle physics in collaboration with Stony Brook HEP faculty. **Dr. George Baldo** (Ward Melville HS Science Teacher and Stony Brook Physiology Department) and **Mr. Chris Murphy** (WMHS, USB graduate) are our contacts at the HS, and Profs. **Engelmann, Hobbs, Grannis, McCarthy, Rijssenbeek and Smith** (ITP) will contribute to projects and mentoring over the summer and academic year.

The program provides hands-on experience to the teachers for the development of classroom tools (e.g. web access to the detector control rooms, web

access to the data and analysis tools, construction of detector demonstration models) to allow them to excite interest and involve physics students and possibly lead to independent study projects. More details are at: <http://www-ed.fnal.gov/projects/quarknet/index.html>.

QuarkNet is currently focused on the High Energy Collider experiments (the Tevatron at Fermilab and the Large Hadron Collider at CERN, Geneva). We will benefit from our existing relationship with Brookhaven National Laboratory for both the D-Zero and ATLAS experiments in this 5-year research experience program.

We hope the program will be extended in the future to include the large neutrino and RHIC experiments. Ultimately, we want to involve 600 high schools in the U.S., a total of 100,000 students.



1999 Intel Competition

What used to be the Westinghouse competition for the most talented high school students in the sciences has been taken over by Intel. What remains the same is the success of students mentored by faculty in our Department. This year we had four semifinalists:

James Napolitano, a senior at Commack High School, mentored by **Phil Allen**

Sandra Nudelman, from Commack High School, mentored by **Harold Metcalf**

Kaisey Mandel, from Great Neck North High School, mentored by **Fred Walter**

Steven Quinn, from Ward Melville High School, mentored jointly by **Fred Walter** and **Ralph Wijers**.

SPACE: LONG AGO IN A GALAXY FAR, FAR AWAY

The discovery, by graduate student **Hsiao-Wen Chen**, Postdoc Sam Pascarella and Prof. **Kenneth M. Lanzetta** and colleagues from Stony Brook, of the most distant known object in the Universe was announced in a recent issue of *Nature*. The object, detected using the Space Telescope Imaging Spectrograph aboard the Hubble Space Telescope, is a galaxy broadcasting particularly strongly in the ultraviolet part of the spectrum, suggesting star formation of youthful vigor. This should be no surprise, as light from this galaxy started its journey to Earth when the Universe was just 5% of its present age. In

technical terms, the galaxy has a 'redshift' of $z = 6.68$. The term 'redshift' refers to the shifting of light to lower frequencies, the shift being greater with distance. This is a consequence of the Doppler effect - as the Universe expands, progressively more distant objects appear to be moving faster and faster away from us. The galaxy reported by Lanzetta and colleagues is so far away that ultraviolet light is shifted into the visible spectrum, and visible light is shifted into the infrared. This latter factor makes distant galaxies very hard to see, because of the absorption of hydrogen clouds in space along the line of sight.

From Our Alumni...

...**Bruce VerWest** (1974; **Andrew Jackson**) has recently moved to England to the Geoscience Technology Group of ARCO's British operations company.

...**Ashok Sen** (1982; **George Sterman**) has been elected a Fellow of the Royal (UK) Society.

...**Steve Crandall** (1981; **Paul Grannis**) is ATT Project Leader working on a new data format that compacts digital recordings of music, a story featured on NPR's All Things Considered last winter.

...**Cornelius Beausang** (1987; **David Fossan**) organized a Physics Olympics for more than 28 teams of high school students in October at the Wright Nuclear Structure Laboratory and Physics Department at Yale University. Parallel competitions were held the same day in Liverpool, England and Perth, Australia.

...**Vinod Mishra** (1983; **Gerry Brown**) works at Lucent Technologies, Bell Labs, where he utilizes physics to create advanced optical networking ideas and products.

...**Sushil Kumar Mendiratta** (1974; **Martin Blume**) and **Guilherme Nunes** (Class of 97, Advisor: **Phil Allen**) both have appointments at the University of Aveiro.

...**Rob Salgado** (MAT '89) is now completing a Ph.D. at Syracuse.

...**Jory Yarmoff** (BS 1978) is a professor of physics at UC Riverside with a joint appointment in the Materials Sciences Division, Lawrence Berkeley National Laboratory.



News Regarding Old Friends...

Maurice Goldhaber, a long-time Adjunct Professor, collaborator and friend, is this year's recipient of the Fermi Award, the highest recognition for scientific achievement awarded by the Department of Energy. Maurice's distinguished career spans over 60 years and he continues his active involvement on the SuperKamiokande experiment. The award was presented by the President in Washington on April 16.

Juliet Lee Franzini, who was on the Stony Brook faculty from 1963 until 1993 and is currently an Adjunct Professor, one of the leaders of the Daphne experiment at the INFN Laboratory (Frascati, Italy), is one of eleven women in Particles and Fields listed for *Contributions of 20th Century Women to Physics* on the web site www.physics.ucla.edu/~cwp.

Faculty Awards Congratulations to All!

Gene Sprouse has won this year's Presidential Award for Excellence in Teaching.

Vladimir Goldman and **Peter Stephens** became APS fellows this year.

Two campus prizes went to members of the department: to **Alfred Goldhaber**, the Student Life Award from Student Affairs and to **Emilio Mendez**, the Hispanic Heritage Month Faculty Award. Receiving awards for 30 years at Stony Brook are: Gerry Brown, Janos Kirz, Thomas Kuo, Robert McGrath and Harold Metcalf.

Adjunct Professor **Ilan Ben-Zvi** has received the 1999 Particle Accelerator Science and Technology Award for 'contributions to high-brightness electron beam technology and superconducting RF technology and leadership of the Brookhaven National Laboratory's Accelerator Test Facility'.

Prof. **James Lattimer** received a J.S. Guggenheim Fellowship. He will be on sabbatical leave during 1999-2000 working on a book with Profs. **Prakash and Swesty**, "Nuclear Astrophysics: From Nuclei to Neutron Stars" (Cambridge University Press).

Prof. **Harold Metcalf** has been elected Divisional Councilor of the Division of Atomic Molecular and Optical Physics of the APS. He is also a member of the Executive Committee of the Precision Measurements and Fundamental Constants Topical Group and Chair of its Education Committee.

Gertrude Goldhaber Prize

This year's winner of the Goldhaber Prize, given by the Brookhaven National Laboratory Women in Science to honor the memory of Gertrude S. Goldhaber, is **Ange-lika Osanna**, student of Prof. **Chris Jacobsen**. She received the award on March 31, at which time she presented a seminar titled "Soft X-ray Spectromicroscopy with a Cryo Scanning Transmission X-ray Microscope".

Astronomers in the News

In the Jan 1. issue of *Science*, the news report by writer Govert Schilling starts with the statement: "Astronomers from the State University of New York, Stony Brook, have won the race to the edge of the universe. After 3 weeks of working around the clock on infrared data from the Hubble Space Telescope, they may have shattered previous records for the most distant stars and galaxies, pushing the frontier of the visible universe to distances so great that they are seen just a few hundred million years after the big bang. Together with his Stony Brook colleague **Amos Yahil**, postdocs **Alberto Fernandez-Soto** and **Sam Pascarelle**, and students **Hsiao-Wen Chen** and **Noriaki Yahata**, **Ken Lanzetta** analyzed data from a very small patch of sky in the southern constellation Tucana, where the Hubble gathered light for 10 straight days last October." (These discoveries are more recent than those reported on page 2; more information will appear in future newsletters...Ed.)

It is with great sadness that we announce the death on February 25 of **Bud (Myron) Good**. He had been suffering for several years from cancer and had been undergoing radiation therapy.

Bud has made a tremendous impact on the department, both as a physicist and as a person. He continued to be active in physics up until his death. His accomplishments and influence in physics and education were extensive and we will miss his counsel. He was 75 years old and had been on the faculty at Stony Brook since 1967.

1998 Books Published by Faculty

The following titles have been added to the printed world of physics:

Nonlinear Dynamics by **Peter Kahn** (John Wiley and Sons)

Atlanta Meeting Reunion

On Tuesday, March 23, 1999, the department and Brookhaven National Laboratory (BNL) hosted a reunion for their alumni who attended the American Physical Society meeting at Atlanta. During that evening more than 100 alumni visited. Former graduate students, who had received their Ph.D. from as far back as 1974, brought us up to date about their professional and personal lives. In addition, several faculty, visitors and postdoc alumni attended. **Linda Johnson**, a former NSL secretary who now lives in Atlanta, surprised and delighted many by also attending! This was a wonderful opportunity for old friends and colleagues to come together and remember.

Paul Vaska, '97

I have been working as a research physicist for UGM Medical Systems, Inc. in downtown Philadelphia for the two years since my graduation from Stony Brook. This small company develops and commercially sells positron emission tomography (PET) scanners for clinical medical use - mainly whole-body cancer surveys but also cardiac and brain studies. The detectors in our scanners are large continuous plates of NaI (Tl) coupled to arrays of photomultiplier tubes for event position determination. My position entails working partly on software, partly with experimental hardware and electronics in order to continuously improve the performance of the scanner while keeping costs competitive.

The work is generally interesting and challenging and involves many concepts of radiation and detector physics I learned as a graduate student in experimental nuclear physics. (Advisor: **David Fossan**)

Ayse Erzan, Class of '76 Writes...

I was very keen on going straight back home after my degree and took a job at the Middle East Technical University in Ankara, Turkey. Then I married and had to move to Istanbul and joined the Istanbul Technical University which has since then become my home. It is true these were troubled times, but also filled with hope and a strange urgency; the feeling that what you did could possibly help change the world for a better and happier place. I was involved in the socialist movement, organizing women and in the anti-nuclear peace committee. When the military took over in September, 1980, and they started persecuting people for such activities, I decided to leave the country and look for jobs in Europe. I had not been doing much research for the past four years and I had to really scramble to catch up. When I left Istanbul in February 1981, I went to Stockholm, where my brother was doing his Ph.D. in economics and I am thankful to Goran Grimvall, then head of the Theoretical Physics department at the KTH, for allowing me to spend four months there. Friends from Stony Brook also helped: Hans Hoye, who had been George Stell's postdoc was kind enough to invite me to spend a month at the Institute for Theoretical Physics in Trondheim. I spent a month at Gotheborg and another in Delft before I left for Trieste, where I spent the rest of the summer at the ICTP. Then I went to Geneva for a year, where I did some very enjoyable work with J.P. Eckmann, in collaboration with B. Derrida, on chaotic renormalization group flows in frustrated systems. Meanwhile, I had applied for a job in Porto, and my dear friend from Stony Brook, Sushil K. Mendiratta, who was (and still is) working in Aveiro, was able to convince the colleagues there that this nobody from outer-space was really ok. So I spent three wonderful and very fruitful years in Porto, did some work on spin glasses, some of it in collaboration with Eduardo Lage, learned the language enough to teach and made lifelong friends.

My first marriage had not worked out and I was alone during this time. I met another political refugee, Orhan Sillier and moved to Germany on a Humboldt fellowship working in Marburg with Siegfried Grossmann, whose mentorship I still cherish. In 1987, Orhan set up the Turkish department at the International Center for Social History in Amsterdam and I found a postdoc with Pietronero in Groningen, where we did some very interesting work on fractals, fractal growth, and anomalous relaxation. In 1990 we moved to Istanbul.

I am grateful to ITU for having welcomed me back. I am now a professor at the Department of Physics and also spend part of my time at the Feza Gursey Institute, a research institute for theoretical physics and mathematics, which I help run.

Meanwhile in 1995, I was elected to the Turkish Academy of Sciences and in 1997 I shared the science prize of TUBITAK, the national science council of Turkey, with Mehmet Erbudak (Yale 1972). Also I am an associate editor of the European Physical Journal B (condensed matter physics).
(Advisor: **George Stell**)

Roland N. Pittmann, Class of 1971

I have been on faculty in the Physiology Department at Virginia Commonwealth University since 1974. I teach medical and graduate students and conduct research in the area of oxygen transport in the microcirculation (exercise, aging, artificial oxygen, instrumentation).

Stony Brook experience was a great opportunity to learn from outstanding mentors in content and style (especially high marks to Professors Eisenbud, Grannis, Kirz and Yang). Advisor: **Paul Grannis**

Rainer Schicker, 1987

I finished my degree in the Nuclear Structure Laboratory in 1987 with Peter Braun-Munzinger. After two postdoc years at Lawrence Berkeley Lab, I moved to GSI Darmstadt, the German National Center for heavy ion research. Subsequently I spent a few years on Aphrodites Island, also known under the name of Cypress. I'm currently back at GSI collaborating on the HADES experiment. At the heart of this experiment are medium modifications of light vector mesons. Stay tuned: soon you'll hear more about Brown-Rho scaling from this side of the Atlantic!!!
(Advisor: **Peter Braun-Munzinger**)

John Harris Class of 1978

I am a Professor of Physics at Yale University. After receiving my Ph.D. at Stony Brook, I spent 17 years at LBO before coming to Yale. I have been spokesperson for the STAR experiment at the Relativistic Heavy Ion Collider at BNL since its inception in 1990. I am married and have a wonderful, supportive family and friends. Besides the family, windsurfing in waves is my personal passion and has been my hobby away from physics for the past 18 years. (Advisor: **Bob McGrath**)

Please direct comments to Pam Burris, Editor.

Celebration of Undergraduate Achievements

Four of our undergraduate students received prizes for their projects presented at the Celebration of Undergraduate Achievements on April 20:

Wei Lun Chao (Best Project in Electrical Engineering), **Christopher Freigang** and **Mary Ifferte** (Best Project in the Physical Sciences and Mathematics), and **Robert Wlodarczyk** (Best Project in Computer Science)

MASTER'S CANDIDATES

Carlos AVILA (M.S.I.)	Seth AUBIN
Tigran BACARIAN	Matthew CASHEN
Satish DESAI	James DICKERSON
Raymond FLILLER	Athanasios HATZIK-
OUTELIS(M.S.I.)	
Michael HOFMANN	Yusuf KINKHABWALA
Bertram KLEIN	Christian LANGLOIS
Gerhard LECHSEL	Matthew MALEK
Tanja MEHLSTAUEBLER	Sergey NOSENKO
Nurlan NURMANOV	Matthew PARTLOW
Joseph REINER	Andrew STEINER
Natasa STOJIC	Chandraika (John) SUGRIM(M.S.I.)
Jennifer THOMAS (M.S.I.)	Matthias WEIGEL

More Student Awards

On April 12, the audience filled the SAC auditorium to honor the best and brightest of the Stony Brook students in the undergraduate award ceremony. Five physics and astronomy students were honored for scholarship: **Avery Broderick**, **Steven Christe**, **Daniel Greenbaum**, **Boris Peker** and **Alexandra Rockefeller**. In addition, Dan Greenbaum received the award for excellence in research from Phi Beta Kappa.

This year's winners for the Edward Lambe Prize for Science and Teaching Preparation are: **Cordelia H. Anthony**, **Joanne C. Figueriredo** and **Alfred E. Gro-matsky**. Each will receive a certificate and a check for \$600 as they begin their teaching careers.

Dan Greenbaum is one of 57 winners of the prestigious NSF Graduate Fellowship in physics in the nation! Dan will continue his education toward the Ph.D. at MIT.

1998-1999 PhDs: Congratulations!!!

NAME	THESIS TITLE	ADVISOR
Penghui AN	Neutron Star Atmosphere and Spectra Analysis	James Lattimer
Mary Josephine BELLANCA	Sub-Recoil Laser Cooling of Helium	Harold Metcalf
Goetz BENDELE	X-ray Powder Diffraction Studies of Fullerene and Fulleride Materials	Peter Stephens
Paul A. CHUNG YOON CHUM	Strange Particle Production and Flow in 2, 4, 6 and 8 A GeV Au + Au Collisions	Robert McGrath
Steffen DEUS	High-Power Josephson Array Oscillators for Terahertz Frequencies	James Lukens
Wei DING	X-ray Structural Analysis of a Neutralizing Epitope In Lyme Disease Antigen OSPA	Janos Kirz
Vladimir GOLOVANOV	Experimental Studies of Magnetic Perovskites	Laszlo Mihaly
Jeffery HACK	Laser Cooling in the Recoil Domain	Harold Metcalf
Margaret Lenore HORNER	Moderate Impurity Densities for 2D Electrons in Strong Magnetic Fields	Alfred Goldhaber
Jiangzhong JIANG	Crystal Structure of prp 18c and p ³²	Peter Stephens (Liaison)
Miguel MARVALL	Studies in Computational Neuroscience: Aspects of Memory and Neuronal Function	Robert Shrock
Lynn MATTHEWS	Galaxy Structure and Evolution at the End of the Spiral Sequence	John S. Gallagher (Deane Peter-son)
Chi NG	Search for $K^+ \rightarrow \pi^+ \pi^0 \nu \bar{\nu}$	Michael Marx
Gianluca ODERDA	Studies in QCD Resummation	George Sterman
Angelika OSANNA	Soft X-Ray Spectromicroscopy with a Cryo Scanning Transmission X-Ray Microscope	Chris Jacobsen
Koenraad SCHALM	String Theory In Curved Space-Time	Warren Siegel
Nathan SHAW	High Energy γ -Rays From Highly Excited Meitnerium	Peter Paul
Luke SMITH	Spectral Statistics and Wave Packets in the Boarding Ellipse Billiard	Nandor Balazs
Joong-Kon SON	Optical Properties of Semi-Conductor Microcavities	Emilio Mendez
Yagmur TORUN	Pion Production in Proton-Nucleus Interactions From Experiment 910	Robert Palmer
Phidung Alex TRAN	X-Ray Molecular Model of DPNM DNA N6-Methyltransferase	Chris Jacobsen
Brett VIREN	Search for Proton Decay to Lepton Plus Neutral Pion	Chang Kee Jung
Thongbay VONGPASEUTH	Two Particle Correlations in Au + Au Collisions at 11.5 GeV/c Per Nucleon	Thomas Hemmick
Jinsong WANG	Characterization of Ion Beam Sputtered Spin Valve Giant Magnetoresistive and Hard Magnetic Thin Films	Richard Gambino (Philip Allen)
Harold WEISER	Topics in Particles and Fields	Warren Siegel
Steven WILES	Studies in Supersymmetry & String Theory	Martin Rocek

APS Student Travel Award Program

The American Physical Society established a Student Travel Awards Program by offering matching grants of up to \$250 to help with travel expenses of selected students to the APS Centennial Meeting in Atlanta, Georgia in March 1999. Our department was allowed to send nominations to this program with the understanding that we would provide matching funds. Each student who was interested was asked to fill out and return a nominating form along with a nomination letter from either **Peter Kahn**, Undergraduate Director or **Peter Stephens**, Graduate Director.

We are happy to announce that the following students were selected:

Undergraduate Majors	Graduate Students
Steven Christie	Todd Bojanowski
Daniel Greenbaum	Tibor Kuc
Boris Peker	

Unfortunately, Daniel Greenbaum could not fit the trip into his schedule, so **Gabor Zala**, graduate student, received the accepted.

1999 Sigma Pi Sigma Inductees

Congratulations to the undergraduate students who were recently inducted into the Physics Honor Society at the department's 21st Annual Ceremony. Professor **Harold Metcalf** presided and issued the awards and Professor **Linwood Lee** gave the congratulatory speech. The inductees were: **Babak A. Azmoun, Steven D. Christie, Nicholas L. D'Imperio, Christopher I. Freigang, Randy H. Garrett, Tokufumi Kato, Alexander B. Lehmann, Boris Pecker, Alexandra A. Rockefeller, and Suny-Yong Yoon.**

The State University of New York at Stony Brook is an affirmative action/equal opportunity employer.

Pond Prize Winners

Each year the department offers a prize to the graduate student who has attained the highest score on the comprehensive examination. This year we are pleased to announce that this honor is shared by three students: **Iouri Chepelev, Olindo Corradini** and **John Wilson**. Each will receive a certificate and a cash prize at the last colloquium of this year.

Challenge Awards

Each January the Physics and Astronomy Department and the Long Island Teacher's Association work together to create and administer the Challenge exam to over 35 participating schools in New York and adjoining states.

Winners who choose to attend Stony Brook receive a \$1000 scholarship toward each of their undergraduate years. Current winners are:

Steven Fiore, Smithtown
Jason Fotinatos, Smithtown
Jasun Gong, South Setauket
Jonathan Janssen, Nissequogue
Pratichi Kothari, Patchogue
Se-Eun Lee, St. James
Paul Papadoulis, St. James
Thomas Reddy, Garden City
Terrence Reilly, East Setauket
Bill Strong, Nesconset

Commencement!

Thursday, May 13: Ph.D. Hooding Ceremony, 2:00, Staller

Friday, May 14
Department Convocation at 8:30am
Main Ceremony at 10:30am
Jack Marburger,
Director of BNL, will address all department graduating students