The University of Connecticut

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Eric A. Cornell, Katzenstein Distinguished Lecturer
Friday, November 15, 2002

Eric A. Cornell, a winner of the 2001 Nobel Prize in Physics, will deliver the 2002 Katzenstein Distinguished Lecture at 4 pm on Friday, Nov. 15, in Rm. 36 of the Physics Building. A reception at 3:30 in Rm. P103 will precede the lecture. Cornell, from the National Institute of Standards and Technology (NIST) and the Joint Institute for Laboratory Astrophysics (JILA) in Boulder, Colorado, shared the award with his JILA colleague Carl Wieman and Wolfgang Ketterle from MIT "for the achievement of Bose-Einstein condensation in dilute gases of alkali atoms, and for early fundamental studies of the properties of the condensates." This work will be the subject of his lecture, tentatively titled: "Stone Cold Science: BEC and the Weird World of Physics a Millionth of a Degree from Absolute Zero."

Atoms are known to possess wave-like properties, but they display them reluctantly. In the 1920's, Einstein extended Bose's work on photons to atoms, predicting that at sufficiently low temperatures, certain atoms would condense into the lowest possible energy state. The resulting state, a Bose-Einstein condensate (BEC), is represented by a coherent macroscopic wavefunction, where the atoms "sing together in unison." The relationship of a BEC to a normal sample of atoms is similar to that between a laser and a light bulb. In 1995, this intriguing state of matter was clearly observed in a sample of 2000 rubidium atoms cooled to 20 nK above absolute zero by Cornell and Wieman and their colleagues at JILA. Since that time, the field has exploded, generating a tremendous amount of excitement in the areas of atomic physics, condensed matter physics, and statistical mechanics.

Having grown up in Massachusetts and California, Dr. Cornell received the B.S. in Physics from Stanford University in 1985 and the Ph.D. from MIT in 1990. After two years as a postdoc at JILA, he joined the staff at NIST as a Senior Scientist. He is currently a Physicist at NIST, as well as a Professor Adjunct at the University of Colorado and a Fellow of JILA.

Dr. Cornell is a Member of the National Academy of Sciences and a Fellow of both the American Physical Society and the Optical Society of America. He is the recipient of the Samuel Wesley Stratton Award from NIST, the Zeiss Award in Optics, the Gold Medal from the U.S. Department of Commerce, the Fritz London Award for low temperature physics, the Rabi Prize of the American Physical Society, the 1997 King Faisal International Prize for Science, the Lorentz Medal, the R.W. Wood Prize, the Benjamin Franklin Medal in Physics, and, of course, the 2001 Nobel Prize in Physics. You are all invited to attend this year's Katzenstein Lecture and to hear about the fascinating phenomenon of Bose-Einstein Condensation from one of its discoverers.

Stwalley Named Board of Trustees Distinguished Professor

Five UConn professors were named to the University's highest-ranking honor, that of Board of Trustees Distinguished Professor. Among them is **William Stwalley**, Professor and Head of the Department of Physics.

With some 100 guests in attendance on April 16 at a reception in their honor, the five were lauded by University President Philip E. Austin, Chancellor John D. Petersen, and Roger A. Gelfenbien, Chairman of the Board of Trustees.

Austin said the title of Distinguished Professor is reserved for superb people who have generally built their reputations at the University.

The 2002 Board of Trustees Distinguished Professors are (left to right): William Stwalley; Yaakov Bar-Shalom; Alexandros Makriyannis; Richard Brown; and David Kenny. Photo by Peter Morenus, Advance, 4/22/02

"Honoring them gives us an opportunity to remember that, no matter how much progress we make - with the completion of UConn 2000 and with 21st Century UConn, with the increase in numbers and quality of students, and in so many other ways - we're building on a foundation laid over the decades by an extraordinary group of scholars."

Stwalley, who is perhaps the world's leading authority on long-range interaction of atoms, is hailed by colleagues for his strong support of the integration of the physics department's research program into the undergraduate experience. In 1995, he established a National Science Foundation-funded "Research Experience for Undergraduates" summer program at UConn that continues to benefit not only our physics majors, but students from other institutions coming from around the country and from abroad to participate.

He has also driven a number of curricular initiatives, including the development of a photonics minor enabling physics majors and some students in the school of engineering to prepare for careers by enhancing their education with practical training in laser-based technologies.

The five professors join 11 other colleagues named to this top award since its inception three years ago.

The Norman Hascoe Lectures on the Frontiers of Science

The Department of Physics has continued to play a leading role in a new lecture series funded by Mr. Norman Hascoe of Greenwich, Connecticut, aimed at exciting undergraduates with scientific interests in frontier areas of science. Each lecture is open to the public and is followed by a reception and an informal panel discussion. In our fourth year, we had four outstanding lectures in the general field of nanoscale science:

1. Dr. **Robert Tycko**, Laboratory of Chemical Physics, National Institutes of Health, "Structural Studies of Alzheimer's Amyloid Fibrils by Solid State Nuclear Magnetic Resonance"
2. Professor **Paul Corkum**, National Research Council of Canada, "An Optical Centrifuge"
3. Professor **Kent Choquette**, Univ of Illinois at Urbana-Champaign, "Vertical Cavity Lasers – New Light for the Information Age"
4. Dr. **Harry Bernas**, Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse, Orsay, France, "Manipulating Magnetic Nanostructures with Ion Beams"

Nanoscale science involves application of the concepts and techniques of physics to systems at a higher level of complexity (e.g. the supramolecular and macromolecular) and is the focus of major federal research funding initiatives. A comparably exciting lecture program for the coming year is being planned.

Juha Javanainen Receives 2001 Chancellor's Research Excellence Award

Our Professor **Juha Javanainen** was selected to receive a Chancellor's Research Excellence Award for 2001. As one of four recipients University-wide, he was officially recognized for this honor at the May 19, 2002, Graduate Commencement Ceremony. Prof. Javanainen is a theorist in the field of quantum optics, the study of the quantum properties of light and how light interacts with matter at the quantum level. His research has had significant impact in several areas including laser cooling, quantum jumps, cavity quantum electrodynamics, and, most recently, Bose-Einstein condensation [see article on Katzenstein Lecture]. Prof. Javanainen received his Dr. of Technology degree from the Helsinki University of Technology and, following appointments in Finland, Germany, and at the University of Rochester, came to UConn in 1987. Our congratulations to Juha!

Sigma Pi Sigma Celebration and Awards

Professor Hal Metcalf of SUNY, Stony Brook presented the Sigma Pi Sigma lecture on "Dark State Physics and De Broglie Wave Optics." His topics were mysteries of quantum mechanics and why it's so good to be in physics, continued by an inspirational message to the students at dinner. The following awards were presented and new members elected.

Five students were inducted into Sigma Pi Sigma, the Physics Honor Society. They are undergraduates **Chris Gauthier** and **Brad Normand**, and graduate students **Phil Gee**, **Julian Klinner**, and **Petr Liska**.

Brad Normand, in the UConn Honors Program, has been doing research with Dr. William Stwalley under the REU and an Honors Research Grant, to be continued with his Honors thesis. Chris Gauthier came to the Storrs campus from the Avery Point branch and is now in an undergraduate research project with Dr. Richard Jones.

Petr Liska and Phil Gee graduated from Bridgewater State College in Bridgewater, MA. Petr's interest is in experimental physics, while Phil has a math background which includes his bachelor's degree. Julian Klinner came from the Ruprecht-Karls-Universität Heidelberg in Heidelberg, Germany. He looks forward to a Master's at UConn followed by work in Germany.

Cory Merow won the Katzenstein Prize for the best science essay by a graduating physics major. His essay, titled "Rhythmic Coordination", was based on physical measurements he made during research done in the psychology department, and the impact of these results on existing theory in the field.

The 2002 University of Connecticut Physics Department Award to a Distinguished High School Teacher for Excellence in Teaching Physics went to Dr. **Victor Mazmanian** of Greenwich High School. His students speak of him as a confidante, driver, educational activities chaperone, friend, guide, humorist, inspirer, lieu parent, moral supporter, morale booster, physics teacher, super enthusiastic classroom teacher, teacher of life, welcoming host, and a zealot of teaching. He inspires his students to excel in a variety of competitions: the Physics Bowl, The Chemical Society Science Bowl, the JETS (Junior Engineering Technological Society) Teams, and the Westinghouse Science Talent Search, among others. Dr. Mazmanian was advisor to a pair of Greenwich high school freshmen who won the International Grand Prize in NASA's "space settlement" competition. Most of all, his students talked of his passion for teaching physics, in and out of the classroom.

Ronald Pepino was initiated into the Phi Beta Kappa Honor Society this past academic year. He joined Sigma Pi Sigma a year ago.

The Physics of Music

New courses for non-scientists are introduced into the curriculum for a variety of reasons. In each case, the syllabus and the labs are chosen to meet certain goals, not the least of which is to enhance the scientific literacy of the students:[1] their comprehension of the scientific worldview and of the nature of scientific inquiry and the scientific enterprise. A course that exemplifies progress towards these goals is "The Physics of Music," recently introduced by **George Gibson**. It is a terminal course that meets the University's Gen-ed science requirements.

George has an interest in music stronger than most, having studied piano to the point of having to decide between a career as a physicist or that of a concert pianist. Recognizing a universal attraction to music, George uses student interest in music to motivate them in the course.

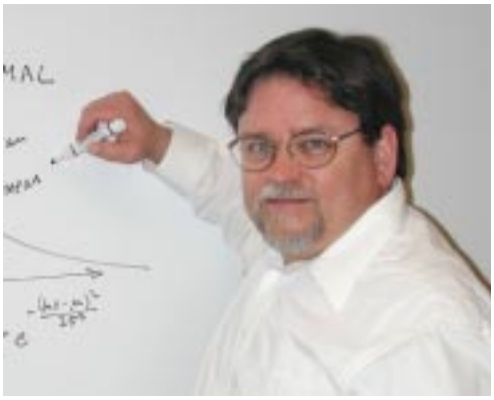
Much more than the traditional "pitch-intensity-harmonics" offering, the course uses spectroscopy to elucidate the nature of both music and science. Students perform experiments that measure the resonances of both one- and two-dimensional acoustic systems, delivering results that are susceptible to quantitative analysis. Spectroscopic analysis like this can be performed in a simple manner only in the frequency domain. It takes a lot of technical know-how to enable in-depth analyses on such systems, by students whose math expertise ends with multiplication by fractions. George has used his extensive experimental expertise to design the resonant systems, to couple the computers to the excitation and detection devices, and to enable students to Fourier analyze the time domain signals. The students are performing experiments and analyses that would have been barely possible in a senior lab for physics majors ten years ago.

Students in this course have performed two kinds of evaluation: 1) course content learned, and 2) attitudes to science. George uses the outcome of the evaluations to fine-tune the offering. An article describing the course was recently published in *Physics Today*, where readers are referred for more details[2].

References

1. http://www.project2061.org/tools/benchol/bolframe.htm
2. "New Themes and Audiences for the Physics of Music" George N. Gibson and Ian D. Johnston, Phys. Today, 24, Jan. 2002.

Dan Strom Elected to NCRP



On April 11, 2002, **Daniel J. Strom** (B.A. Physics, 1971; M.S. Physics, 1973) was elected to a six-year term as a member of the National Council on Radiation Protection and Measurements (NCRP; http://www.ncrp.com). Chartered by Congress in 1964, the NCRP's mission is to assemble expert guidance on the whole spectrum of radiation protection science, technology, and practice.

Strom, a staff scientist in the Risk Analysis and Health Protection Group at Pacific Northwest National Laboratory (PNNL) since 1991, brings to NCRP experience in a variety of radiation protection topics, including the dosimetry of intakes of radionuclides, applied statistical inference, occupational dose reconstruction, indoor radon, and radiation risk assessment. Previously he spent eight years as Associate Professor of Health Physics in the Graduate School of Public Health at the University of Pittsburgh. At Connecticut, Dan assisted Professor Quentin Kessel with a number of projects in the Van de Graaff Accelerator Laboratory. Kessel remembers Dan as having great energy and imagination. After leaving UConn, Dan worked in radiation safety and later earned his Ph.D. at the University of North Carolina at Chapel Hill in Environmental Sciences and Engineering (Radiological Hygiene) in 1984.

Strom serves as an Associate Editor of *Health Physics*, and holds a comprehensive certification from the American Board of Health Physics. He is married and has two sons and two stepdaughters. His web site is http://www.pnl.gov/bayesian/strom/strombio.htm.

Guggenheim bestows fellowship on Xinsheng Sean Ling

Xinsheng Sean Ling, Assistant Professor of Physics at Brown University, was named a 2002 Guggenheim Fellow. Sean received his Ph.D. at UConn under the tutelage of **Joseph Budnick** in 1992. Ling will use his Guggenheim Fellowship to take a year-long sabbatical at Harvard to work with Harvard biophysicist Amit Meller and Harvard biologist Daniel Branton and to extend his research on nanopores. Focusing on nanopore DNA sequencing, Ling hopes to find a way to allow scientists to view the genetic information in DNA, one molecule at a time. Standard DNA sequencing – the polymerase chain reaction – is slow. Ling hopes to greatly speed the process of DNA sequencing and possibly help detect viruses used in biological warfare.

A nanopore, or ion channel, is a tiny hole in a cell membrane (ten thousand times smaller than the diameter of a strand of human hair). Scientists can measure the voltage produced by an ion passing through the hole. When a large ion traverses the nanopore, a bigger resistance is generated and different ions can be identified. Branton has pioneered the detection of genetic information of a DNA molecule while a DNA strand is driven through a nanopore. Currently, biologists use a natural nanopore, which is actually too long to detect a detailed sequence of DNA. Ling hopes to develop an artificial nanopore that is smaller than a natural nanopore and, therefore, capable of sequencing DNA.

The John Simon Guggenheim Memorial Foundation grants money to its fellows so that they can pursue their own "scholarly or creative work" during a block of time free from other duties. One hundred eighty-four Guggenheim Fellowships were awarded this year. The Fellows were selected from a pool of more than 2,800 applicants, ranging from painters to political scientists to biologists. Ling also has a Salomon Award from Brown to help him get started on his new line of research.

New Faces/Retirements

At the beginning of the new Fall semester, Dr. **Susanne Yelin** has just joined the faculty of the Department of Physics. Susanne comes to UConn from the Institute for Theoretical Atomic, Molecular, and Optical Physics (ITAMP) located at the Harvard-Smithsonian Center for Astrophysics (CfA), and the Harvard Physics Department, where she has been a Feodor Lynen Fellow since Fall 1998. Prior to her appointment at ITAMP, Susanne spent one year as a Postdoctoral Fellow at the Research Laboratory of Electronics at M.I.T., where she carried out theoretical research on the physics of semiconductor quantum well optical devices.

Susanne received her Ph.D. in Physics from the Ludwig-Maximilians-Universität (LMU) in Munich in 1998, following her Diploma in Physics from the University of Stuttgart in 1994. In her Ph.D. studies, she worked with Prof. A. Schenzle (LMU) and M. Scully at Texas A&M University (College Station) on atomic coherence in dense media. She held appointments as a visiting scientist at the Max Planck Institute for Quantum Optics in Garching for many summers and the Optical Sciences Center in Tucson (Arizona).

Susanne's current research interests cover a wide spectrum of topics. She is working on quantum coherence and interference effects in optics, as well as resonant nonlinear optics, and their applications. She also studies correlations and cooperative effects in light-matter interactions, and coherent optical techniques for mesoscopic objects. Her work on that subject provided the theoretical foundation for the experimental realization of slow light and trapping of photons in atomic ensembles by storing the quantum states of the radiation field in collective atomic excitations. Susanne is extending this work to solid-state systems, as well as exploring the effects of weak quantum fields in semiconductor nanostructures. Susanne's expertise in the theory and modeling of light-matter interactions will bridge Atomic, Molecular and Optical Physics and Condensed Matter Physics. Her arrival this August is a welcome addition to both programs.

Dr **Kyungseon Joo** joins us as an Assistant Professor, coming from Jefferson Lab in Newport News, Virginia. His appointment is made under an agreement between UConn and Jefferson Lab designed to enable promising postdoctoral researchers in the labora-

tory environment to make a smooth transition to an academic career. Dr Joo served as a Postdoctoral Fellow with Professor Ralph Minehart at the University of Virginia from 1997 to 2000 after receiving his Ph.D. in Physics from M.I.T. in 1997, under Prof. Bertozzi. He also holds a Masters in Electrical Engineering from the University of Utah (1989). The focus of his recent research has been the CEBAF Large Acceptance Spectrometer (CLAS) experiment at Jefferson Lab, which uses electrons and photons of 1-6 GeV to probe the currents inside the proton and its excited states. He developed a technique to separate the effects of currents inside the proton from complications to the electron's trajectory due to relativity. At UConn he will extend this technique to look at the quark structure of the nucleus. His expertise both in detectors and in physics data analysis will further strengthen the nuclear physics group at UConn. Kyungseon's research also enhances our partnership with Jefferson Lab. Kyungseon, his wife and two sons enjoyed visits to us and plan to move here by the end of the year.

Paul Generous retired last year from his position as Academic Assistant II for the department. "Professor" Generous has taught and shared technical knowledge with generations of students (and faculty!). He was originally hired to work with Professor Damon in the low temperature laboratory and moved on to do most of the department's cryogenics work. A licensed electrician, he expanded his knowledge base to include laboratory plumbing and wiring, as well as other basics such as vacuum technology, electronics and chemical safety. Paul saved the day more than once for us. He now travels and operates his boat, but still finds time to assist us with technical work on a part-time basis.

David Perry has the position vacated by Paul Generous. Dave received his Ph. D. in our department under the tutelage of Prof. Douglas Hamilton. He then held a National Research Council postdoctoral associateship at Aberdeen Proving Ground, MD, where he worked with Dr. George Thomson, a 1970 Ph.D. from our department. He left there to work with Dr. **Sal Fernandez**, a 1975 Ph.D. who founded Ciencia, Inc. in East Hartford, CT. He has also taught courses for us for a number of years and continues to do so. Dave is also proving to be someone we can count on to resolve our frequent "emergencies."

Dr. **Olga Nikolayeva** from the University of Latvia has received a highly competitive NSF-NATO Postdoctoral Fellowship for a year and is spending it at the University of Connecticut working on heteronuclear alkali dimers (e.g. KRb) under the tutelage of William Stwalley. The research is of considerable value because of the KRb photo-associative spectroscopy (PAS) planned under the NSF group grant awarded to Profs. Ed Eyler, Phil Gould and Bill Stwalley, and a major new grant of the European Commission for a Research Training Network on Cold Molecules (involving 11 European sites and our group at UConn). Olga's advisor, Prof. Ruvin Ferber, has actively collaborated with Dr. Stwalley, supported first by the National Research Council and now by the NATO Science for Peace Program. Olga, who received her Ph.D. from the University of Latvia last year, has published 10 papers and presented her results in five international conferences. She has contributed significantly to the development of a new apparatus for PAS which produced its first spectra this summer.

Dr. **Oleg Makarov** joined the Department in January 2002 as a Research Associate in the group of Prof. Win Smith. Oleg does experimental and theoretical research under an NSF grant entitled "Cold Atomic and Molecular Ion-Atom Collisions in a Hybrid Trap." The object of this research is to use techniques of laser cooling, trapping and manipulation of cold neutral atoms, to make a refrigerator for the sympathetic collisional cooling of an overlapping sample of atomic or molecular ions, to achieve very low temperatures, such as those found in outer space. We hope this research will open a virtually unexplored area in basic atomic, molecular and optical physics with potential applications to ionic reactions in the interplanetary medium and also to trapped-ion quantum computing information. Oleg is highly qualified for this challenging project, having received his M.S. degree from Moscow State University, specializing in quantum optics, spectroscopy and laser physics. He earned his Ph.D. at the University of Kentucky with Prof. Keith MacAdam, where he worked on the physics of highly-excited atoms. He joins the research effort here after two years as a National Research Council Research Fellow in planetary science at NASA/Caltech's Jet Propulsion Laboratory in Pasadena, CA.

Dr. **Gary Prézeau** joined us after completing his first post-doc with the Jefferson Laboratory Theory Group and Hampton University. Gary earned his BS and MS in Canada at the Universities of Sherbrooke and Toronto, respectively, and has lectured and taught at the Institut National de La Recherche Scientifique and the University of Malawi. He received his Ph.D. from the College of William & Mary in theoretical nuclear physics. Gary is currently working with our Professor **Michael Ramsey-Musolf** at Caltech. He studies effective field theory of parity-violating electron scattering off the deuteron and neutrinoless double beta-decay. The latter can be used to set limits on physics beyond the standard model, such as the mass of a heavy Majorana neutrino and parameters appearing in supersymmetric extensions of the standard model.

Dr. **Michael Rozman** was hired this past winter to take care of computer needs in the department. He also maintains, improves and updates the department's webpage. Michael is familiar with a variety of software and operating systems and is charged with making sure it all works together and plays well. Michael is an established computational physics researcher in his own right and adds another dimension to the research enterprise of the department as a whole.

In Fall 2001, we welcomed a new postdoctoral researcher, Dr. **Shinsuke Nishigaki**, who is working on quantum field theory with Gerald Dunne. Shinsuke obtained his Ph.D. from the University of Tokyo, and has done research at some of the leading theoretical physics institutes in the world, including ITP Santa Barbara, Niels Bohr Institute, Stony Brook and the Technion. He is an expert in random matrix models and effective field theories, which have many applications in theoretical condensed matter physics as well as in theoretical particle physics.

John Calsamiglia, Ph.D. 2002, University of Helsinki, joined the research team of **Robin Côté** this past January. He is working on aspects of quantum computing using Rydberg atoms, building on his background in quantum optics. Quantum information is a novel approach that promises to revolutionize the data storage and processing industry.

Professor **Shihui Ge** has been a visiting scholar in our department since September 2001. She is a Professor of Physics at Lanzhou University, People's Republic of China (PRC) and directs a large active group in magnetics research there. Dr. Ge is intensively studying properties of nanoscale magnetic materials.

Dr. **Mingzhong Wu** from the Huazhong University of Science & Technology in Wuhan, PRC, was appointed a postdoctoral research associate beginning June 2001. His interests lie in high frequency properties of magnetic materials. Both Professor Ge and Dr. Wu are collaborating with Joseph Budnick and William Hines in studies of nanoscale magnetic materials. This is a joint research program with Dr. **Yide Zhang** of the Inframat Corp. of Willington, CT. On a personal note, congratulations to Dr. Wu and his wife who welcomed a new member to their family in April – they now have two beautiful daughters.

Dr. **Hardial Dewan** joins the team of Dr. Chandra Roychoudhuri in the Photonics Research Lab of the Department of Physics from UHV Technologies, Inc. in New Jersey.

Dr. Dewan earned his Ph.D. at the Heinrich Hertz Institute in Berlin, Germany, where he researched microwave spectroscopy, after his M.S. from Punjab University in India. Dr. Dewan held several research positions before coming to UConn. He worked at Multi-Arc. Inc., where he participated in the development of improved processes for nitride and molybdenum disulphide coatings for dies, tools, fuel-injection components, etc. In a year and a half at Research 2000, Inc. in West lake, OH he developed a novel process for producing planar field emitter diamond arrays with micron sized emitter sites and perfectly clean gate areas for a NASA project, earning a congratulatory letter from the Dept. of Technology Utilization, NASA for his contribution. Hardial has also held research associate positions at Michigan State, Penn State and Northwestern in Illinois.

Hardial is currently working on two projects: (i) spectral properties of second and third harmonic light generated by short pulses, and (ii) continuously tunable, very narrow line Grating Coupled Surface Emitting Laser (GCSEL). Both of these technologies promise applications in wavelength division multi-

plexing for fiber optics communications.

Dr. **Yongyuan Jiang** received his Bachelors Degree in Physics from Northeast Forestry University in 1993, and his Doctoral Degree in Optics from Harbin Institute of Technology (HIT) in 1998. He was a faculty member at HIT, and then an Associate Professor in the Department of Applied Physics at HIT in the People's Republic of China. His research is on diffractive optics, optical information processing, optical data storage, especially on the photorefractive effect and its applications in inorganic crystals and organic polymer films. Yongyuan is now a Postdoctoral Fellow in the photonics lab of Dr. Chandra Roychoudhuri where they are working on time domain interference, diffraction, dispersion and their applications in wavelength division multiplexing for fiber optic communications.

Dr. **Gary Bent** (Ph.D. 1977) is retiring as Deputy Chairman and Lecturer in Physics before the fall semester begins to begin teaching physics at E.O. Smith High School in Mansfield, CT. Gary has always heartily enjoyed teaching, and this move enables him to devote the majority of time to instilling the wonders of physics in his new charges.

Ralph Bartram remembers, "I have known Gary Bent for thirty four years, and have interacted extensively with him as both friend and mentor. We first met when he was a young lieutenant stationed as a Research Scientist at the U.S. Army Explosives Laboratory, where I was serving as a consultant. He was subsequently transferred to the University of Connecticut where, with the rank of captain, he taught ROTC courses from 1971-1974. He was simultaneously enrolled as a graduate student in the Physics Department, where I served as his major advisor and teacher in several advanced graduate courses. From 1974-1978 he served as a Research Scientist at the U.S. Military Academy at West Point, and during that period he completed his Ph.D. thesis research under my direction.

"I have always found Gary o be conscientious and efficient. Beyond his administrative skills, I have been most impressed with his exceptional industry and initiative. His performance as a graduate student was outstanding, in spite of his military duties. He has a keen interest in teaching techniques and computer-based modernization of teaching laboratories, and has secured substantial external funding to pursue the implementation of his ideas, an activity that clearly exceeds his defined duties. His continuing research productivity in the field of quantum chemistry is astonishing, since, in his position, the opportunity to do research is more of a concession than a professional obligation. Gary possesses the highest character and ideals, interacts effectively and sympathetically with students, and is devoted to his family and community. I am confident that he will be an outstanding asset to E. O. Smith High School in his new role as a secondary school physics teacher."

Gary has served other department heads as well, although not for as long. They are: Joe Budnick, Kurt Haller and currently Bill Stwalley. He has served on numerous committees, notably those concerned with safety and the smooth operation of the department. Gary has been extremely active in the

In January of 2002, Dr. **Thomas Ehrenreich** accepted a postdoctoral position with Professors **Quentin Kessel**, **Edward Pollack** and **Winthrop Smith**. Under their NASA grant, he will split his time between the department's Van de Graaff Accelerator Laboratory and the NASA Jet Propulsion Laboratory. At both he will measure atomic and molecular cross sections using highly charged ions (also found in the solar wind) of astrophysical interest. Thomas received his B.S. and M.S. from the University of Aarhus, Denmark, and his Ph.D. from Kansas State University. He is the coauthor of more than a dozen articles and has already proven to be a valuable addition to the project.

Fernando receives Sri Lankan Presidential Award

Professor **Gayanath Fernando** received a Sri Lankan Presidential Award in recognition of collaborative research carried out with the Institute of Fundamental Studies in Sri Lanka. The time period was 2000-2001, and the research project was performing Stoner-Hubbard-type calculations on Fe-N compounds. (Physical Review B 61, 375 (2000) plus papers to appear later.) A. Kovoor, Interim Director of the Institute, stressed the importance to Sri Lanka of Dr. Fernando's collaboration with scientists of that country and welcomed him on his visit of December 01/January 02 for the award ceremony.

continuing education of science teachers (K-12) and in the Kids are Scientists, Too (KAST) programs. We hope he continues to champion both of those causes. Gary promises to remain in contact and will hold an adjunct appointment with the department. For that we are glad, but will miss having him here. Best wishes to you, Gary.

7 7 7 Particles and Waves 7 7 7 7 7 7

Physics East and West

One of the top concerns for the security of the U.S. and its allies is the proliferation of capability to build and deploy weapons of mass destruction. The collapse of the Soviet Union produced this dire situation. A large number of scientists from the former Soviet Union (FSU) who were formerly cut off from mainstream scientific exchange are now free to pursue basic research in an open environment. But support for their research has stalled, leaving them under- or unemployed. Their availability for hire by anyone who pays them poses grave security problems. In response, the U.S. Civilian Research and Development Foundation (www.crdf.org) was set up to provide support research in collaborations of U.S. and FSU scientists and engineers.

In January 2002, Armenian physicist A. Sirunian and Richard Jones were awarded a joint research grant to support a basic research project at the Yerevan Physics Institute (YerPhi) located in Yerevan, Armenia. A. Sirunian is the Associate director of YerPhi, one of the top high-energy physics research laboratories of the FSU. The goal is to perfect techniques pioneered at YerPhi to measure accurately the degree of linear polarization of a high-energy beam. Besides scientific merit, the project offers practical benefit to researchers in the U.S. who plan to exploit these techniques in the construction of a new polarized beam for the GlueX experiment at Jefferson Laboratory in Newport News, VA, in which Richard is playing a leading role.

Yerevan is the capital and largest city of Armenia and is situated south of Tbilisi, Georgia, and not far from a border with Turkey. It is an ancient city founded on the site of a fortress established in the eighth century BC. Historically important for trade and military strategy, many centuries later it is flourishing once more.

United Kingdom awards Gerald Dunne

Professor **Gerald Dunne** has joined the Editorial Board of the *Journal of Physics A* (Mathematical and General), which is published by the Institute of Physics (UK). He was also made a Fellow of the Institute of Physics (UK).

A paper, "Particle number fractionization of an atomic Fermi-Dirac gas in an optical lattice," by former UConn graduate student, Janne Ruostekoski, now in a faculty position at the University of Hertfordshire (UK), together with UConn faculty members G. Dunne and J. Javanainen, was featured on the Physical Review Focus website. See: "When the Atom Falls Apart," http://focus.aps.org/v9/st21.html. This paper proposes that the phenomenon of fractional particle number, which is well known in condensed matter and particle physics, could also be observed in the atomic regime. The paper is published in Phys. Rev. Lett. 88, 180401 (2002).

Not Time Yet

Professor **Ronald Mallett** has received a lot of press space and TV time lately. They are paying attention to his theory of time bending by a circulating beam of light occupying a small space. The most accessible is in the Christian Science Monitor edition of May 16, 2002. The Science & Space article by Mary Kuhl traces Dr. Mallett's motivation from early childhood experiences to the present. It presents theoretical arguments and proposes experimental verification.

Aside from American television, such as WBZ in Boston, three foreign documentary teams have taped Dr. Mallett. Ben Bowie, a television director in England, visited at the end of April and is interested in doing a major hour long documentary about Ron's research and the subject of time travel. The program will appear sometime next year on The Learning Channel. This is an ongoing project for Mr. Bowie, who will follow the development of Ron's theoretical

ideas on space and time twisting due to circulating laser beams as well as the experimental research that will be conducted by Dr. **Chandra Roychoudhuri** to test those ideas.

A German TV crew came here on May 1 to interview Ron for a German science news program called Nano, produced by Klaus Simmering. It will be broadcast throughout Germany, Austria and Switzerland. The interview centered on predictions of gravitational frame dragging and closed time-like lines (i.e. time travel) due to the gravitational field of a circulating laser beam. The German TV director told Ron that in Germany his work is very popular. The crew spent the entire day with him, following him from his home to the University and back.

A Japanese TV crew, with producer Hiro Koh, videotaped Ron on another occasion. The interview will appear on a program entitled "Discovering the Wonders of Our World" on TBS (Tokyo Broadcasting System) sometime in August. Japanese people in general are devoted to exchanging gifts, particularly of artfully made items. Ron received a beautiful set of sake pitcher and cups. Interest in scientific advances is very high in Japan.

Ron's latest appearance is in the Hartford Advocate, August 1-7, 2002 as "Time Travelin' Man" where the author discusses theories of others in the field (see http://www.hartford advocate.com/articles/timetravel.html for the whole story by Alistair Highet).

Ike Blonder, probably our first physics major (1938) and a native of Waterford, Connecticut, was recently inducted into the New Jersey Inventor's Hall of Fame. He was recognized as a pioneer in TV technology, a founder of Blonder-Tongue Technologies, and the holder of more than 50 patents. A July 14, 2002, column in the New London Day was titled, "Inventor sets his sights on Nessie." Ike has been contributing technical expertise to hunters of the Loch Ness Monster, the latest being a device that records any sound in the water and, after a delay, transmits it back to fool any lurking monster into thinking its territory has been invaded!

Rocky Mountain High

Howard Hayden retired from UConn Physics to Pueblo West, Colorado, near where he spent his boyhood. He and his wife, Jill Moring, live in sight of stunning mountains and enjoy benign weather.

Howard has a long-standing interest in energy and publishes a monthly newsletter, "The Energy Advocate," now in its seventh year. He teaches a course per semester at the University of Southern Colorado in Pueblo, usually the equivalent of our 121/122, but last semester taught E&M on the level of 255/257. That is a one-semester course on an at-least two-semester subject. USC is slated to become Colorado State University/ Pueblo in July 2003.

Howard's book "The Solar Fraud" has been published by Vales Lake Press, copyright 2001. Subtitled "Why Solar Energy Won't Run The World," this paperback of more than 200 pages exposes the many misconceptions nurtured by believers concerning "free" sunlight and who or what stands in the way of its use. Distinguishing clearly between energy in a useful form and energy in general, the book shows how wind, water and light fall short of supporting a world industrial economy.

Filled with fact, "The Solar Fraud" is also brimming with Howard's unmistakable brand of humor. Special appearances are made by Congressional pronouncements, blaring newspaper headlines, and an over-the-top Playboy interview of Ralph Nader. Reaching for a metaphor, the editor sees Howard as a linebacker (in a sport dear to Colorado) in pursuit of a running back who is just as determined but not as fleet of foot. Nader is not a good running back, since he is incapable of changing direction or making use of his

blockers.

In his youth Howard did odd jobs such as driving a school bus. He is still on call for the odd job that needs him. Lately he did repair work on school athletic scoreboards and fixed a tractor for baseball field use.

Jill earned her Ph.D. in Chemistry at UConn with the late Ed Kostiner. She is very crafty at crafts, especially intricate and delicate work such as making jewelry and clothing. She is finishing a book of bead patterns. Howard likes to see people's eyes light up when she wears one of her creations. She is serving as the Education Chair for the Embroiderers' Guild in Colorado Springs. As officers in large organizations know, there is a mountain of work to do before the big meeting.

A Good Life After Retirement

Ralph Bartram retired ten years ago after 31 years of dedicated service to his field, the Physics Department, and the University of Connecticut. He is pleased to attest that there is a good life after retirement. In his case, he has maintained his high motivation and creativity for theoretical research in solid state physics.

Ralph writes, "I never had a reason to stop. My external funding for research on potential laser materials continued for several months after my retirement became official, with a dissertation and several manuscripts pending. During the following year I spent a three month delayed sabbatical leave as a Senior Visiting Fellow in the Optical Materials Research Center at the University of Strathclyde in Glasgow, Scotland.

"I have engaged in a number of other research related activities since my retirement. I have been employed as a consultant to a research group at Boston University and to a small company in Massachusetts on the development of scintillator materials for medical applications. I have continued to collaborate with former colleagues at the University of Connecticut and at the Hungarian Academy of Sciences on investigations of radiation damage in insulating crystals. I participated actively in six international conferences, two in the United States and one each in England, Germany, the Czech Republic and South Africa, and I continue to serve on the international advisory committee for the International Conference on Defects in Insulating Materials."

Ralph has published refereed journal articles at an average rate of two per year since retirement and co-authored two books as research monographs (totles furnished upon request). He is almost constantly called upon to act as a referee himself.

Ralph has advanced on the home front as well. He and Ellen, his wife, divide the year between homes in Connecticut and Florida, which allows them to play golf perhaps twice a week, summer and winter. They enjoy cruises to exotic destinations. Of their four grandchildren, two are UConn students, one a junior and one a senior.

Since retiring, **Robert Schor**, **Dwight Damon** and **David Markowitz** have led many activities for the Center for Learning In Retirement (CLIR). This is a membership organization that is part of the College of Continuing Studies at UConn. It is a lifelong teaching and learning center that holds classes and other events for intellectual and social stimulation. Most classes meet in the Windham Cottage of UConn's Depot Campus.

David has been President of CLIR, Bob is on the Curriculum Committee, and Dwight is on the Executive Council. All have presented courses, David on the History of Zero and of Infinity, Bob

on Modern Physics for Non-physicists, and Dwight on Events That Are Shaking Our World.

After retirement, **Bob Erickson** has improved his golf game. (We now call him Tiger Erickson.) Bob and **George Vartenigian** take traveling physics shows to schools, where they dazzle the children with demonstrations they explain through physics. They call themselves Demos R Us.

His Heart's In San Francisco

Tony Bennett sang that he left his heart in San Francisco. **Fred Lipschultz** found his heart there and could not be happier.

Fred is a birder, a photographer, and a devotee of digital technology. For a number of years he has assisted the Thin Film/Cryogenic Electronics Group Laboratory at San Francisco State, where he goes about three times a week. He is the "webmeister" for the group's web site, whose moniker is most apt: http://coolchips.sfsu.edu/

Fred makes wide use of the San Francisco cultural scene. A brief list of activities in April: Olympia Dukakis speaking on "Greek Tragedy and the Theater" (She was in "Moonstruck" and Michael Dukakis was moonstruck), concerts by the San Francisco Symphony, on-stage production of the Yiddish Radio Project (airing on National Public Radio), and a talk by Michael Frayn, award winner for the play "Copenhagen." Fred's personal website is http://home.pacbell.net/lipschul.

The protective garb is called a bunny suit. Photo edited by Fred's colleagues.

CCSU Honors Kristine Larsen

Central Connecticut State University (CCSU) recognized Dr. **Kristine Larsen**, Associate Professor of Physics and Earth Sciences and co-director of the Honors Program, as an extraordinary teacher, along with her colleague, sociologist John Mitrano. Celebrating outstanding teaching as the core of its mission, CCSU has honored two of its finest professors with the 2001-2002 Excellence in Teaching Award. Kristine received her Ph.D. from UConn in 1990 for work supervised by Ron Mallett. At CCSU she joins earlier graduates of our program, Professors Sadu Sadanand (1980 Ph.D.) and Ali Antar (1977 Ph.D.-who currently serves as Kristine's Department Head). CCSU President Richard L. Judd announced the recipients of the award at a ceremony in Founders Hall and lauded "their dedication in shaping student learning by using creativity and by inspiring students through rigor and contagious enthusiasm."

Dr. Mitrano, Dr. Larsen, President Judd.

"Both awardees are superbly competent and grounded in the breadth and depth of their disciplines," said Dr. Christine Doyle, chair of the Excellence in Teaching Award Committee. "Both are passionately committed to bringing their subject areas to students in the best possible way. They work consciously and reflectively at their teaching." The honor carries a $1,000 award to be used for the recipients' professional development in the coming year. Selection is based on a comprehensive process with nominations coming from the CCSU community at large; full-time and part-time faculty members are eligible.

Larsen, who joined the CCSU faculty in 1989, said: "Discovery is the true scientific method. That important point and the concept of respecting students as human beings are the very heart of my philosophy of teaching." In accepting the award, she thanked her "students who have taught me there is always something new to be learned." Both honorees are widely acknowledged by colleagues and students

for a dedication to teaching that inspires extraordinary learning. In the August 25, 2002 issue of the Hartford Courant's Northeast Magazine, Kristine Larsen was recognized in an in-depth profile on Connecticut's top 12 undergraduate teachers. This cover article, titled "The Great Profs of Connecticu,t" was written by Rand Richards Cooper.

The "Laws of Physics"

Gary Edwards received his Ph.D. in '89 under the guidance of Professors **Randy Gilliam**, **Larry Kappers**, and Ralph Bartram. His research involved studies of point defects in insulating materials. After UConn, Gary joined a research group headed by Dr. Larry Halliburton at Oklahoma State University as a Visiting Professor. When Larry accepted a position as Department Head at West Virginia University a year later, he invited Gary and his former graduate student, Mike Scripsick, to continue the group at West Virginia. They moved and rebuilt the research lab at West Virginia University and successfully kept the lab operational with research funding from various sources, both public and private over the next four years. During that time, it became clear to Gary that staying in academic physics was not the best career path for him and he turned his interests to law school.

Gary received his law degree at the University of Pittsburgh in 1997 and accepted a position as an associate at a West Coast based law firm that specializes in intellectual property issues, then Skjerven, Morrill, MacPherson, Franklin and Friel LLP, now Skjerven Morrill LLP. He found

the transition from academics into the legal world of patent acquisition and protection both fascinating and intellectually stimulating. Additionally, his physics background and training have proven to be extremely valuable in helping his clients protect their technologies (and occasionally helping them to develop those technologies further). Gary represents clients in various fields of technology, including nonlinear optics and optical devices, telecommunications, semiconductor processing, memory systems, computer systems, underground line location systems, and quantum computing. He is involved in all aspects of technology protection, including patent prosecution (both domestic and foreign), licensing, and litigation.

Stacy Vargas at Virginia Military Institute

Stacey Vargas earned her Ph.D. with major advisor **Doug Hamilton**. Always a hard worker, she kept fit by running miles each day. While she was with the Department she was Stacy Kefalos, so most readers may remember her under that name.

"I just finished my sixth year as an assistant professor at the Virginia Military Institute. I received tenure this spring and will be promoted to associate professor effective in August. After a slow start due to funding issues, I have finally put together a nice laser spectroscopy laboratory. We had a pulsed Nd:YAG laser with frequency doubling and tripling ability and we just completed the construction of a dye laser system. I am looking forward to actually using the set-up to do experiments soon. In addition, we have a low-power air-cooled argon ion laser which we have been using to do some forensic work on latent fingerprinting. I absolutely love teaching and especially enjoy working on independent research projects and senior thesis projects with the cadets. As for my personal life, Albert and I are enjoying every minute with our daughter Maria (21 months) and look forward to the arrival of another baby sometime in July. I still enjoy my morning runs (well, walks at this point in my pregnancy) and masters swimming. I would love to hear from all of my UCONN friends so please email me at Vargas@vmi.edu." (The last time we spoke to Stacy was before July-we're waiting for details on the newest addition.)

Around the Western World to Bridgewater

Ed Deveney received his Ph.D. for research with Prof. Quentin Kessel. He was awarded a DOE post-doc to do research with Sheldon Datz, the 2000 Fermi Award winner, with whom he produced and studied the first ultra-relativistic beam of lead atoms at CERN. He did the physics for, and managing of, a US DOE program with Russia, called New Independent States Industrial Partnering Program (NISIPP) to build and use an electron spectrometer at ORNL.

Next he set sights on the nearly-impossible two-body problem: wife Missy at Tufts and Ed orbiting. Melissa is an assistant professor at the Tufts School of Veterinary Medicine where she also serves as Director of Sports Medicine. Ed taught at UConn one year, then landed visiting assistant professorship at Wheaton College. This propelled him to two years of visitorship at Amherst College.

At Amherst he set up an atomic scattering lab and supervised a student. He teamed up with David DeMille in a fundamental test of boson statistics at Amherst and at UC Berkeley. How perfectly do we know that photons are bosons? is the subject of a Physical Review Letter (1999) and an AIP Conference Proceeding (2000, Italy).

Ed is in a tenure track position at Bridgewater State College (BSC) in Massachusetts, south of Boston. The department of four is all newly hired within two years. He was awarded grants to begin a laser cooling and trapping lab, developed electronic and mechanical chaos experiments, and programmed Hartree-type codes using Maple. He and Melissa collaborated on models of the equine pulmonary system as RLC circuit and Helmholtz oscillator.

Ed was awarded a "BSC Last Lecture" (UConn has a similar program), which he devoted to "Schrodinger's cat and the consequences of our spooky quantum reality." He spends Fridays at home with two small daughters who keep him in physical shape. Three of his former students are in grad school at UConn in physics (including Sigma Pi Sigma inductees Phil Gee and Petr Liska) and a fourth in chemistry.

The New England Sections of the American Physical Society and the American Association of Physics Teachers have their joint fall meeting at BSC. Ed is running the APS side of the show. It's a big job. He'll find out. Ed welcomes emails at edeveney@bridgew.edu.

VISITS FROM OUR MAJOR DONORS

During the past year we have enjoyed visits from all of our major donors. Drs. **Connie and Henry Katzenstein** were here in November to listen to this year's Katzenstein Distinguished Lecturer, Alan Heeger, give a marvelous talk on conductive plastics. Also in attendance was **Isaac "Ike" Blonder**. This June, **Nagavarapu Mohan** and his wife, **Paritala S. Kamala**, showed their son, Sri, the campus and spent the afternoon searching the local environs for the various rentals they had lived in while Mohan worked on his degree with Professors Dwight Damon and **Paul Klemens** and Kamala taught in the mathematics and statistics departments. We are indebted to these individuals for making a significant difference to the department. We are also pleased with the generosity of others of you. The form on the next page is intended to prompt further generosity! If you are one who contributes to the more general requests made by the University, we would be delighted if you would direct such contributions to the Physics Department! Using the fund numbers from the following form will ensure that your contribution goes where you intended. These contributions make a world of difference to us, both to our morale and to our effectiveness.

The Katzenstein Distinguished Lecture Series Endowment does much more than just provide the annual lecture. It also provides a prize for the best undergraduate research paper in physics

each year. The departmental members have contributed significantly to this endowment, and funds from it are also used to provide for the initiation banquet meals for the new Sigma Pi Sigma inductees and a monetary award to our best graduate teaching assistant, the "**Marshall Walker Teaching Award**."

"Still maturing," are the **Isaac S. and Lois W. Blonder Graduate Fellowship** in Physics and the **KMS Nagavarapu Graduate Award** in Physics. These are newer endowments and may not be drawn on until their incomes have accumulated for three years. We are eager to provide our top graduate students with supplements from these funds.

I/we are interested in supporting the Physics Department programs. Please direct my gift of $_____ to:

- Katzenstein Distinguished Lecture Series Endowment (30438-2014)
- Charles Swenberg Memorial Endowment (30641-2014)
- Isaac S. and Lois W. Blonder Graduate Fellowship Endowment (30743-2014)
- KMS Nagavarapu Graduate Award Endowment (30723-2014)
- Physics Department Unrestricted Fund (20555-2014)

Matching Gift

- I work for a matching gift company. The form is enclosed.

My company is: _____

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phone/fax _____

Please send your contribution directly to the

University of Connecticut Foundation
2390 Alumni Drive
Storrs, CT 06269-3206

Thank you for your support!

SAVE THE DATE
November 15, 2002

Invitations for the Katzenstein dinner will go out in September to those of you with New England, NY, NJ and PA addresses. If you are interested in attending and live outside of this area, please contact Kim Giard at 860-486-4924, email: kim.giard@uconn.edu for an invitation.

Any news about yourself that you are interested in sharing? We have enjoyed the unsolicited mail we received as a result of our last newsletter so now we're actively soliciting. Please send suggestions to:

David Markowitz, Editor
at Department address.

(Folding both ends of this sheet in will turn the response form into a mailer.)

From:

Professor Quentin Kessel, Ph. D. UConn '66
University of Connecticut
Department of Physics
2152 Hillside Road
Storrs, CT 06269-3046

Yes, I will attend the November 15, 2002 Henry Katzenstein Distinguished Lecture.

_____ Please reserve _____ places at the banquet.

_____ Please send me a reminder for the March 2003 Reynolds Lecture.

_____ Please send me a reminder for the April 2003 Sigma Pi Sigma Lecture.

We're thinking of instituting an alumni section for our Physics web page with links to others. What do you think? Would you like to be included?

My email address to be listed: _____.
My web site address which is: _____.