DuCharme Joins Department

In accordance with departmental goals to increase and expand the number of experimental faculty in general and to strengthen the condensed matter physics group in particular, a fifth experimental condensed matter physicist, Assistant Professor Stephen F. DuCharme, was hired last January. His appointment is two-fold: in the Department and one-up the UN Center for Materials Research and Analysis (CMRA). Set-up funds for his new laboratory for studies of nonlinear optical, polymeric and crystalline materials will exceed $20,000, funded mostly by the Nebraska Research Initiative through the CMRA.

Scion from Newton's Apple Tree

Planted at UNL

William Shakespeare wrote about his friend, Isaac Newton, "... the notion of gravitation came into his mind. It was assisted by the fall of an apple as he sat in a contemplative mood." Newton himself wrote about his time at home in Woolsthorpe, England during the plagues of 1665-66, "I began to think of gravity extending to the orb of the moon, and from Kepler's rule I deduced that the force which kept the planets in their orbs must be reciprocally as the squares of their distances from the centers about which they revolve: and thereby compared the force requisite to keep the moon in her orb with the force of gravity at the surface of the earth." These are the sources of the famous legend in which Newton formulated the law of gravitation after watching an apple fall from his tree.

The very tree in Newton's yard which presumably played such an important role in the Newtonian Revolution now has an "offspring" just south of Bobiles Laboratory. It all started some years ago when Edward Lyman, a retired physician in Lincoln, read a biography of Newton and wondered what variety of apple tree was involved in this momentous discovery. His friend Joseph Young, a retired UNL horticulture professor, was able to make contact with Dr. Richard Keeling, a physicist at York University in England who had made a study of Newton and had carefully researched the apple tree story. In his investigation of the story, Keeling had contacted a descendant of Edmund Turner, the one who had purchased the Woolsthorpe estate shortly after Newton's death. The estate had remained in the Turner family until recently. From early engravings of the estate obtained from the Turner family, Keeling was able to identify an apple tree, still flourishing at Woolsthorpe, which closely resembled the one there at the time of Newton.

A graft of the tree had been made around 1800 and from that a cutting was made and transported to Lincoln a few years ago. After the required quarantine period, it was ready to be planted in its permanent spot south of Bobiles Laboratory. This was done at a ceremony on April 6, 1991, attended by Professor Keeling and several University dignitaries. A plaque was placed by the tree which reads:

In 1991 this scion from Sir Isaac Newton's famous apple tree at his birthplace in Woolsthorpe Manor, Lincolnshire, England, was presented to the University by Dr. Richard G.W. Keeling of the Physics Department of the University of York, England. This tree is of the ancient cultivar, Flower of Kent.

Following the planting, a program was held in Brase Auditorium during which the horticulturists described how the tree came to Nebraska followed by a fascinating lecture presented by Keeling entitled "The Story of Isaac Newton's Apple Tree." In the evening he gave another lecture "The Incomparable Genius of Isaac Newton."
Chairman's Letter

Spring 1991 marked the third anniversary of the last Departmental Academic Program Review (APR) in Spring 1988. At this mid-point between the previous and the next APR review in 1994, the faculty met to review our progress on the recommendations and goals that were agreed upon in 1988. As I shall be taking a sabbatical leave from teaching during the academic year of 1991-1992, I thought it would be a good time to give you an update on our progress and plans for the future.

As you will see from the attached letter, a number of changes have been made in the past three years. Among these are the addition of several new faculty members, the restructuring of the departmental administration, and the implementation of a new grading policy. The department has also benefited from increased funding for research and travel, which has allowed our faculty to further their research and to share their findings at conferences throughout the country.

In the future, we plan to continue to support our research activities and to provide our students with the best possible education. We also plan to expand our efforts in outreach and service, and to continue to work with our community partners to address the needs of the local community.

I would like to express my appreciation to all of our faculty, staff, and students for their hard work and dedication in making our department a success.

Anthony P. Starace
Chairman

Kirby Receives Distinguished Teaching Award

Professor Roger D. Kirby received a college-wide Distinguished Teaching Award at the University of Nebraska at Lincoln for his outstanding teaching and student advising. His award was presented during the university's spring commencement exercises.

Roger D. Kirby

Professor Kirby was cited for "his outstanding teaching and student advising. He has consistently demonstrated excellence in both areas, and his students have consistently praised his teaching effectiveness and the quality of his advising. He has also been an active participant in the university's teaching and advising programs, and has made significant contributions to the development of new courses and curricula."
Fuller’s Physics Education Grants Top $2.4 Million!

This past year Professor Robert Fuller successfully attracted grant funds in the areas of physics education totaling over $2.4 million. The largest is a four-year grant for $1,479,982 from the National Science Foundation (NSF) to make what he calls the “CD-ROM (compact disk)读
read only memory) Toolkit” for physics teachers. Using compact disk technology to store data, he is producing 12-embryo disk which hold up to 660 megabytes of information. This is equivalent to 100,000 pages of text. The entire contents of 10 textbooks, sets of test questions, scientific equipment catalogs, house plans, demonstrations, pictures, handbooks, journal articles, and much more are recorded on discs to be made available to physics teachers.

Other funded projects include “Transforming Physics Laboratories Using New Technologies” ($36,986), “Bridges, Bicycles, and Traffic: Thematic Physical Science Lessons” ($14,826), “Transforming Physics Content Using New Technologies: A Leadership Development Workshop” ($312,980), and “Using New Technologies in Teach Physics” ($8,995). An additional $859,813 grant from the Department of Education is for “A National Interactive Media Project for Secondary Physical Science Courses.” This is to operate the UNL-based Instructional Materials Center (IMC) for the American Association of Physics Teachers. Fuller is editor of IMC.

The grants have enabled him to bring several visiting physicists who specialize in educational innovation to Nebraska. These include Amazah Kabatya from the British Columbia Institute of Technol
ology in Vancouver, B.C.; David From the School of the Osage, Point Lookout, MO; and Eryk Cooper from the University of Delaware. In collaboration with Charley Lang of Omaha Washakie High School, Fuller is editing a large number of physics films to put on a set of videodiscs with the title, “Physics Cinema Classics.”

Fuller’s involvement in physics education has deep roots. Like the rest of the faculty, he has contributed to the education of students by teaching courses in physics since he joined the faculty in 1969. But in addition, since the early 1970s he has also been involved in educational research and in the utilization of new technologies in teaching. Among the many programs he has pioneered on this campus are the use of the Keller plan of teaching, the use of film loops, the funding of the Physics Learning Center, the development of the ADAPT (Assign on the Development of Abstract Processes of Thought) program of learning used in several departments on campus, the use of computers to provide personalized systems of instruction, and the use of Triangulation-based educational methods. The University of Nebraska has given him two Distinguished Teaching Awards but recognition of his work has extended far beyond the campus as well. He has had numerous workshops on educational subjects in many places and in 1980 was elected the President of the American Association of Physics Teachers. In 1986 he was one of six faculty members in the country to be honored by the American Association of Higher Education.

Starting in the 1970s Fuller was able to attract federal grants to carry out many of his educational projects. During the Reagan years, however, education was not a high priority in the federal government and grant funding for such purposes dried up. Under President Bush educational projects are once again being emphasized.

Robert Fuller with Charles Lang, a physics teacher at Omaha Washakie High School, views over 1000 hours of physics films to select segments for their three-videodisc set entitled “Physics Cinema Classics.”

shifts of ejected spectra, and in 1970 he made his most famous "first," the observation that ejected electrons "prefer" to travel with the ve

of the incident ion (called "charge transfer to the continuum").

Over the following years and decades Rudd produced copious quantities of accurate, reliable data for a large number of phenomena which contributed sig

ificantly to theoretical advances in understanding the basis for these phenomena. Indeed, as one of the distinguished external supporters of

Rudd's award nomination noted, "The name of Eugene Rudd as an author of an experimental paper . . . has become a kind of seal of dependabley.

It is for this reason that Rudd is often asked to write major reviews of his field, including, most recently, a major one published in 1985 in Reviews of Modern Physics.

In his teaching Gene Rudd has brought to bear the same care, attention to detail, and enthusiasm for continuous improvement that he brings to research. He served three years (1978-81) on the College of Arts and Sciences' Task Force on the Liberal Arts, which instituted the current liberal education requirements for the College. He then developed both two-semester and one-semester "Liberal Arts Physics" courses, which he has taught for 10 semesters since 1980. Since no suitable texts for these courses could be purchased he developed his lecture notes into a book. In the past 6 years Rudd has developed two other new courses: a physics course on "scientific revolutorial" for the "Universities Honors Program and a course on "issues in Science and Religion."

These courses were very well received by UNL students. Many com

mented on how Rudd drew their attention to applications of Physics. They also note how he went out of his way to introduce demonstrations, historical photographs, and original scientific documents into his lec

tures. In their course evaluations, undergraduates have written that "his enthusiasm is contagious" and that "he encourages students to find con

nections between physics and life."
Rocky Mountain Consortium for High Energy Physics Established

The University of Nebraska-Lincoln is part of a nine-university consortium established last week to conduct experimental high energy physics research at the Superconducting Super Collider (SSC). The other members of the consortium are the University of Arizona, the University of Colorado, the Colorado School of Mines, Colorado State University, the University of Kansas, Kansas State University, the University of Oregon, and the University of Wyoming. The consortium was awarded $250,000 by the Texas Nuclear Research Laboratory (TNRNL) to fund a six-month pre-construction and planning program in the summer. At the end of the year the members of the consortium will decide whether to continue with the SSC project.

Research Highlights

We present here a selection of recent research results by the Department's faculty and staff who have been accepted for rapid publication in Physical Review Letters (PRL). In the 31 December 1990 issue of PRL, Assistant Professor B-Huang Liao and a group from the General Motors Research Laboratory reported on their first time-resolved measurements of the TlBa(2)CuO(3) superconductor. A ultrahigh-frequency 180 X 180° pulsed light pulse was observed by the electrons in the superconductor. These results were obtained by monitoring the temperature-dependent reflectivity change as a function of time delay after the excitation pulse. The results were found to be consistent with the behavior of conventional superconductors, indicating that phonons play a significant role in this high-temperature superconductor. A fast electron beam was used to excite the sample and to observe the response.

In the 8 April 1991 issue of PRL, Assistant Professor Stephen P. Davis and a group from the Department of Physics reported on their detection of the first observed double electron transitions in the superconductor. The superconductor was excited using a laser and trapping of charge in a photomultiplier with a superconducting detector, thereby allowing the observation of quasiparticle transitions. This measurement is expected to lead to the development of new optical devices and to new techniques for the manipulation of quasiparticles.

In the 8 July 1991 issue of PRL, Postdoctoral Research Assistant Chung Fan and Professor Anthony H. Stares reported results on the impact-ionization model for a solid-state detector. Their model includes a comprehensive treatment of the impact-ionization process and is based on a detailed analysis of the energy transfer process in the detector material. The model is expected to be useful for the design and optimization of high-resolution detectors for particle physics.

Prolonging Scientists Visit UNL

Dueling 1991 a number of nationally and internationally prominent scientists in physics and astronomy visited UNL. Professor Lincoln Wolfenstein of the Carnegie-Mellon University gave a Departmental Colloquium in March on "Massive Neutrons and the Dark Neutrin Problem." Wolfenstein, who is a member of the National Academy of Sciences, has proposed an explanation of the observed neutron flux from the sun. In April the Montgomery Distinguished Lecturer was Professor Owen Chamberlain, Nobel laureate in physics and member of the American Academy of Arts and Sciences. Chamberlain was awarded the Nobel Prize in 1959 for his discovery of the neutral pion. In May the Distinguished Lecturer was Professor E.P. Wigner, who is a member of the National Academy of Sciences, and the American Academy of Arts and Sciences. Wigner was awarded the Nobel Prize in physics in 1963 for his work on quantum mechanics and the theory of symmetry. In October the Distinguished Lecturer was Professor J.W. M.wf, who is a member of the National Academy of Sciences, and the American Academy of Arts and Sciences. Winfrey was awarded the Nobel Prize in physics in 1966 for his work on the theory of symmetry. In November the Distinguished Lecturer was Professor S. Cohen, who is a member of the National Academy of Sciences, and the American Academy of Arts and Sciences. Cohen was awarded the Nobel Prize in physics in 1964 for his work on the theory of symmetry.
Staff Activities

Patty Christen, the Accounting Clerk for the Department, received the Rigid Tuley Award for her outstanding contributions to the department during the past year. She handles the department's payroll and accounts receivable and payable. She was recently given a $65 million annual salary increase.

Professor Robert G. Fisher, Kar-Hing Leng, and Noojine Sim- mer received an Rigid Tuley Award for their contributions to the department on February 23, 1991. For this award, awards to students for nominal faculty members who have made a significant decrease in their work or their scholarship.

Professor Roger Kirby and Research Assistant Professor Cliff Be- tte received a citation from the United Department of Education and the Lincoln Public Schools for their work in conjunction with the Saturday Science Program, which has enrolled 500 5th and 6th grade students for the past 4 years.

The University of Nebraska chapter of Sigma Xi, the scientific research society, gave the Support of Science Award to Walter Lozan, who is an Instrument Maker III in the Department of Academic Computing.

The manuscript of the book, "Fundamentals of Relativity," by Professor Lee Swertia has received favorable reviews and is scheduled to be published by the University of California Press next month.

During his leave in the second semester last year, Professor Edward Schmidt worked at the Dominion Astrometric Observatory in Victoria, British Columbia where he analyzed CCD images of stars in other galaxies in search of exoplanets. He is presently a member of the Ultraviolet Monitoring Group of the Space Science Division at the National Aeronautics and Space Administration in Washington, D.C. analyzing images of star fields.

The Environmental Program to Stimulate Competitive Research (EPSCOR) was established by Congress and, through the efforts of Senator Robert Kerry, it was recently expanded to include Kansas and Nebraska. The program has been applied for the Nebraska EPSCOR Committee. The proposal is focused partially through the Department of Energy and the National Science Foundation and is administrated individually by the participating states, which also share in the funding. The University of Nebraska is planning to submit one or more proposals.

Professor and Chairman Anthony Stares was awarded a one-month post as Professor Associate at the Université Pierre et Marie Curie in Paris, France. For the past two years, Stares and his research group have carried out theoretical calculations of the prompt decay method of the decay of these states.

Recently published by Van Nistad Reinhold was The Astronomy and Astrophysics Encyclopedia edited by Stephen Mason which contains an article by Professor Ken-Choong Leng entitled "Galactic En- vironments." It also represented invited papers at the General Assembly of the IAU Symposium on Observational Processes In Interacting Binary Stars held at Coimbra, Portugal. On his return from North America, he visited the Houston Indian settlement in the remote island of Nauru in eastern Kauai. He attended the recently revised trend of hazards, the piranha fish, crocodiles, and tropical diseases. During his brief stay there, Leng was co-ordinator of two exhibits at the Lents Center for Culture at UICL: The Strategies of Brazilian Impression and Crafts from June through October, 1991, and Paintings by Lu Chen and Zhou Bi-cong from October to December 1991. He also arranged for the visit of two prominent Chinese painters from Beijing, China whose works were exhibited.

Photo of the Missing Sweezy-Minnich Telescope Discovered

In the Fall 1986 Spectrum we told you the sad story of the missing Minnich lens. Back in 1995 astronomy professor G. D. Sweezy set out to build a 12'-in. reflecting telescope for the University. Dr. Charles S. Minnich, a Palmer, NE, physician, around the lens and for several years Sweezy and the Engineering Department worked on the con- struction of the telescope tube, drive mechanism, and mounting. In 1917 the Board of Regents appropriated $25,000 to build an observ- ory for the telescope from plans which had been painstakingly drawn up by Sweezy. But just before construction began, the appropriation was canceled, the building was not built, and consequently the tele- scope was never put to use. In 1973 Commander Charles Minnich, grandson of Charles S. Minnich, contacted the Department to learn the whereabouts of the lens. A thorough search failed to turn up the lens and neither the late nor telescope has yet been found. Blueprints of the telescope and the observatory still exist but there were no known photographs of the mighty instrument.

Last year, however, Professor Eugene Hadd was looking through some old papers found in the bottom of a box in the Department, "pol- luted" when he came upon a part of a page from a magazine which had a picture of the telescope! At the top were inscribed the words "From "Every Week" December 27, 1915." Although not too clear, the picture shows the 12-foot high iron base, the telescope support, and the 18-foot long telescope tube with several large counterweights. The article says that Sweezy worked on the construction with three genera- tions of engineering students, giving all of his spare time from 1917 to 1915 to build the 319 separate parts in the instrument. The labor and over $6000 had been spent. The telescope was to be the largest in the state and one of the largest in the Midwest. It was to be Sweezy's gift to the University. Also, it was not to be. And the immense amount of work expended on the project was left to be auctioned; certainly a prime example of being penny wise and pound foolish.

More fortunate was the fate of the six-inch lens that Commander Minnich gave to the university in 1960. It is the essential element in the four-telescope unit of the Mount Palomar Observatory, outside a second story win- dow in Perseus Hall and used by astronomy students and faculty. We reported on its dedication in the 1986 Spectrum.
Rebecca Richards Wins Presidential Young Investigator Award

Rebecca Richards-Kortum (B.S. 1986) received a National Science Foundation Presidential Young Investigator Award (PTI) in 1990. This award was funded by the Biomolecular Engineering and Environmental Systems Division of the Biological and Critical Systems Division of the Directorate for Engineering. She is the second of our graduates to receive this high honor. Chita-Gowri (B.S. 1976) received a PTI award in 1984.

Rebecca Richards

Rebecca Richards earned her Ph.D. at the Massachusetts Institute of Technology in 1990 and is now Assistant Professor of Electrical and Computer Engineering at the University of Texas at Austin. Her research interests are in the applications of optical spectroscopy in biomedical engineering. In particular, she has studied the possible use of fluorescence spectroscopy in the clinical diagnosis of arteriosclerosis and neoplasia. Such spectra contain information on the concentration, absorption and scattering properties, and fluorescence quantum yield of each tissue component. In addition to formulating and testing new models of light attenuation, she is developing methods of obtaining the information as a function of position in a sample. In her work she collaborates with scientists and clinicians at the University of Texas Medical Branch at Galveston, and engineers in the Biomedical Engineering Program at the University of Texas at Austin.

Besides her research work, she teaches a class in freshman physics for engineering students. She writes that at UNC, "...your freshman physics course is ordered of magnitude better than the one here. I find it extremely difficult to work with computer-generated homework and exams." She is working hard to improve the course and has tried several ideas to achieve that end. Each student is encouraged to sign a contract with the instructor spelling out what the student is expected to do and what the level of commitment of the instructor is. Over half of the students have signed the contracts. She generates interest by interweaving her lectures on physics with lectures on engineering topics and other real-world applications. Some examples that she cites are talks on the clutch and brakes of the F-15, how to fly a wind instrument, and the thermostat. But most important, she says, is to make herself more accessible to students.

Besides her professional life, Rebecca and her husband are expecting their first baby in January.

An Alumnus Shares His Memories

In January we received a letter from Raymond L. Murray (M.B. 1941) who received his Ph.D. degree at the University of Wisconsin in 1949. He is Professor Emeritus of Physics in the Department of Nuclear Engineering at North Carolina State University. Box 7009, Raleigh, N.C. 27695-7909. We quote his letter.

"I'm looking forward to getting a copy of the history of the Department. The names Almy, Marvin and Smith are familiar to me even though it has been fifty years. I majored in Physics while a student at Teacher's College. With a B.S. in 1940 and received my M.S. in Physics in 1941. Earlier, I was a lecture assistant to Dr. Almy in his beginning course. He was a very good instructor. I recall as well his advice to me to try to be better organized. And Dr. Marvin, who read from his lecture notes while overly some them on the board. We could get a beautiful set of notes every lecture without having to think at all. And Dr. Smith—who bluntly told me I was not capable of getting a Ph.D.—served as a strong stimulus for me to do just that. I would enjoy hearing from some of my classmates of that era."

Donald Schneider Honored

On January 13, 1992 Donald Schneider (B.S. 1976) will be featured as the lead speaker at the two-day meeting Imagery in Science, hosted by the National Academy of Science for government and industry attendees. His talk is to be "Charge-Coupled Device Sky Survey." Two days later, he will be a special invited speaker at the American Astronomical Society meeting to be held in Atlanta, Georgia. The presentation book, First Light: The Search for the Edge of the Universe by Richard Preston (New York: Atlantic Monthly Press) of 1987 describes the work of the group of astronomers at the Palomar Observatory including Schneider as one of the main characters.

In the 1989 Spectrum we reported on the discovery by Schneider and his colleagues, Maurits Schmidt and James Gunn, of the most distant known quasar, 14 billion light years away. An article describing their discovery has now been published (Astronomical Journal 106, 837, 1991). The quasar, labelled FC 1227+3406, has a redshift of 4.897 which corresponds to an age of 9.9% of the estimated age of the universe.

With Jesse Greenstein as an additional collaborator, the investigations reported in the same journal (p. 1140) on the discovery of an astronomical object with an even greater redshift, the redshift ever seen in the infrared sky survey conducted at the California Institute of Technology's Palomar Observatory.

Last May Schneider returned to UNL to give a talk "Through a Very Large Glass, Darkly," at our annual Physics and Astronomy Recognition Luncheon. In the talk he described the Hubble Telescope and its problems.

Science on the Great Plains Set for Publication

We reported in last year's Spectrum that the manuscript of the book Science on the Great Plains, the History of Physics and Astronomy at the University of Nebraska-Lincoln had been completed. It was submitted to the Faculty Scholarly Publications Committee in May 1990. After some delay it was sent to a number of outside reviewers, whose comments were returned in February 1991. While the reviews were favorable, a number of changes and additions were sug- gested. In June the revised manuscript went to the University of Nebraska Press for editorial work, layout, and printing and is now scheduled to come out in the fall. Elsewhere in this (on page 9) you will find information on how to order your copy.

One of the external reviewers wrote, "Science on the Great Plains is a unique contribution to the history of science in the U.S. It is the only study of which I am aware that not only gives in detail the development of a Physics and Astronomy department in a midwestern university from its origins to the present, but also gives an insight into the remarkable scientists who created it and brought it international recognition in the early years of this century. It will be of value to all those who have an interest in the growth of science and science education in the Midwest."

In addition to the early history of physics and astronomy at the University of Nebraska-Lincoln, the book follows the departments through the Great Depression, the two World Wars, through the era of great growth in the 1930s and early 1940s and the period of stability and produc- tivity of the late 1970s and 1980s, and brings the story right up to the present. The book is dedicated to the memory of Dr. Will B. Brass, the man who founded the Department and gave it great distinction before his untimely death in 1969.

The deleted speeder contains a list of faculty and other staff mem- bers, all of the graduate degrees awarded, and a compilation of the publications from ice Department up to 1965. Since we went in all the trouble of gathering that data and because we felt that many of you alumni and former faculty members would be interested in it, we plan to have the appendices reproduced separately as a supplement in the book and will make that available to you as well.
Acknowledgments

The Department is very grateful to the following individuals and corporations for their new and continuing financial contributions during the period 1 November 1990 - 31 October 1991. These contributions have been made in support of major items of capital equipment, graduate fellowships, undergraduate scholarships and invited lectures as well as for unrestricted purposes. Those who have not been contacted by one of the University of Nebraska Foundation's telephone campaigns or who might be considering an additional tax-deductible gift to us should note that we have the following general accounts at the UN Foundation:

(1) Physics & Astronomy Development Fund (for unrestricted gifts) (Account No. 2037.0)
(2) Physics & Astronomy Lecture Endowment Fund (Account No. 3021.0)
(3) Physics & Astronomy Scholarship Endowment Fund (Account No. 3003.0)

Contributions to any of them may be made conveniently using the contribution card and return envelope enclosed with the mailing of this newsletter. Checks should be made payable to the University of Nebraska Foundation and should indicate for which account the money is intended. Those contributions whose employers have a matching gift program should indicate this. Thank you very much!

Bashan S. Arawal (Ph. D. 1974)
Kevin D. Aylesworth (M.S. 1986, Ph.D. 1989)
Bellore
Thomas E. Bullock (M.S. 1979)
Louis J. Caplan (M.S. 1964, Ph.D. 1975)
CBS Inc.
Mr. & Mrs. James C. Coo
Mohila Nath De (M.S. 1966, Ph.D. 1990)
Robert D. Daulton (B.S. 1950, M.S. 1972, Ph.D. 1975)
Daniel E. Dunn (B.S. 1984 Eng. Phys.)
Thomas E. Parkash (B.S. 1973)
John S. Gallagher
Charles F. Gayton (B.S.EE 1950)
David M. Gray (B.S. 1977)
Bert H. Hartzell (A.B. 1939 Math/Physics)
Hughes Aircraft Corp.
IBM Corp.
William J. Lannan (M.A. 1968)
Joseph B. Meck
Robert L. McKeen (B.A. 1948)
Charles B. Minnich (B.Sc.EE 1927)
Douglas B. Mitchell (B.S. 1968 Math/Physics)
Debra J. Moakness (B.S. 1988)
Burton E. Moore
Donald C. Moore (B.A. 1942)
Stuart O. Nelson (M.A. 1954)
Mr. & Mrs. Joseph L. Parker (Ph.D. 1940 Chemistry/Physi-)
Rockwell International
Jerry E. Rockman (B.S. 1962)
M. Eugene Rudd (Ph.D. 1960)
Franklin J. Sarazen (M.S. 1962)
James J. Schmitt (B.S. 1956, M.B. 1957)
Donald P. Schneider (B.S. 1970)
Morris W. Sergeant
Anthony F. Starace
Terry J. Teays (Ph.D. 1980)
Kweng Mow Yoo (M.S. 1964)
Departmental History Book

The book "Science on the Great Plains: The History of Physics and Astronomy at the University of Nebraska—Lincoln" by M. Eugene Rudd is in press and will be available in the spring of 1992. A supplement is also provided which lists all faculty, most of the supporting staff, all graduate degrees awarded, and a list of the early publications from the Department.

You may order the book, together with the supplement, for the pre-publication price of $20. After March 1, 1992 the price will be $25. Use the order form below to reserve your copy. Please make your check payable to the University of Nebraska Foundation and send it together with this order form to:

Patricia J. Christen, Accounting Clerk
Department of Physics and Astronomy
Behlen Laboratory 260
University of Nebraska
Lincoln, NE 68588-0111

Order Form

"Science on the Great Plains: The History of Physics and Astronomy at the University of Nebraska—Lincoln" plus the Supplement

Number of copies ______ @ $20 (Price until March 1, 1992)
Number of copies ______ @ $25 (Price after March 1, 1992)

Amount enclosed ______

Name ____________________________

Address ____________________________

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________________________________________________________________________
Obtain your copy of the history of the Department using the order form on the reverse of this page!
**1990-91 DEGREE RECIPIENTS**

**Bachelor of Arts**

Kenwood D. Beegling (August 1990). In a Physical Science Technician for the United States Department of Agriculture at The Soil Science Laboratory in Ames, Iowa.

Theodore J. Epstein (August 1990). Is a member of the Stage Crew at the Lied Center for Performing Arts while job hunting for a scientific or technical position.

Mark L. Tarkowski (August 1990) is job hunting.

Todd A. Yilk (With Distinction, May 1991). Has enrolled in the graduate physics program at Yale University.

**Bachelor of Science**

Bao Quoc Vu (August 1990). Is enrolled in the graduate program in physics at UNL.

Yuxin Zhang (August 1990). Is enrolled in the graduate program in physics at the University of Michigan at Ann Arbor.

Jane E. Peterkin (Astronomy, December 1990). Is enrolled in the graduate program in Electrical Engineering at UNL, working with Professor John Woollam.

Ronald A. Symowicki (December 1990). Is enrolled in the graduate program in Electrical Engineering at UNL, working with Professor John Woollam.


Michael G. Reiner (May 1991). Is enrolled in the graduate program in Electrical Engineering at UNL.

Thomas G. Snodgrass (May 1991). Worked at Sandia National Lab in Albuquerque prior to taking up his duties as an officer in the Nebraska Air National Guard. Plans graduate study in physics upon completion of his service commitment.


**Master of Science**

Francis N. Caputo (Astronomy, May 1991). Has enrolled in the graduate astronomy program at the University of Colorado-Boulder.


Rui Qi (May 1991). Is engaged in doctoral research with Professor John R. Hardy.


**Doctor of Philosophy**

Bhola Nath Bc (August 1990). Is a Project Scientist at the Materials Research Corporation in Orangeburg, N.Y.

Bing Liu (August 1990). Is a postdoctoral research associate with Professor Dennis Alexander in the UNL Center for Electro-Optics.

**1990-91 HONORS**

**1990-91 Fellows**

Kenneth W. McLaughlin

Bruce W. Moodry

Rui Qi

Dulip A. Welipitya

Jing Yang

**1990-91 Scholarships**

Gregory R. Burtus

Anita L. Fritz

Erin S. Green

Dean M. Homan

David L. Johnson

Joseph B. Jamners

Michael R. Lewis

Jane E. Peterkin

Christopher T. Potter

Samuel P. Rankin

Thomas G. Snodgrass

**1991 Distinguished Teaching Assistant Awards**

Steven P. Tonder

Jaegwon Yoo

**1991 Burlington Northern Faculty Award for Distinguished Teaching and Scholarship**

M. Eugene Rudd

**1991 College of Arts and Sciences Distinguished Teaching Award**

Roger D. Kirby

**1991 Regents KUDOS Award**

Patricia J. Christen

**1991 Recognition Award for Contributions to Students**

Robert G. Fuller

Kam-Ching Leung

Norman R. Simon

Marilyn T. McDowell

**1991 Lincoln Board of Education Citation**

Clifford L. Bettis

Roger D. Kirby

**1990-91 Society of Physics Student Officers**

Todd A. Yilk, President

Dean M. Homan, Vice President

Eric S. Green, Secretary

Kristine L. Warner, Treasurer
Faculty Professional Activities

Research (Co-Ed.).


Leo Sartelet: Nominating Committee (Chairman), APS Forum on Physics and Society.

David J. Sellmyer: Program Committee, Joint SM/Intermag Conference, 1991 (Co-Chair); Program Committee, Magneto-Optical Recording Conference, Tucson, 1992; Program Committee, Magnetism and Magnetic Materials Conference; State of Nebraska EPSCOR Committee.

Anthony F. Starace: APS Division of Atomic, Molecular, and Optical Physics (Past Chairman); APS Search Committee for the Editor of Physical Review A; General Committee, International Conference on the Physics of Electronic and Atomic Collisions.

1991-92 Visiting Staff Members

On our staff as Visiting Professors this year are experimental atomic physicist Sam J. Cipolla (Ph.D. 1969, Purdue) from Creighton University; Marvin B. Zeng (Ph.D. 1965, R.P.I.) on sabbatical from the School of the Orakke; and condensed matter theorist John Fleckner (Ph.D. 1969, Nebraska) from the University of Nebraska-Omaha.

Visiting Associate Professor this Fall is Amarnath Kahrn-tryan (M.Ed. 1976, British Columbia) from the British Institute of Technology, Burnaby, BC, Canada.

Visiting Assistant Professors this year are experimental condensed matter physicist Charles B. Robbins (Ph.D. 1969, Illinois); physics education researcher Evelyn B. Tsou (Ph.D. 1990, Delaware); and Yong Zhang (M.S. 1985, Tsinghua Univ., Beijing) on sabbatical from Hunan Univ., Quanzhou, Fujian, P.R. C.

In our Department as Postdoctoral Research Associates this year are experimental condensed matter physicist David Hillenbach (Ph.D. 1987, Nebraska), working with Professors J. Hardy and Ullman; experimental atomic physicist Youjung Chun (Ph.D. 1989, Nebraska), working with Professor Sampson; theoretical atomic physicist Ning-Yi Du (Ph.D. 1990, LuBu), working with Professor Starace; experimental atomic physicist Zheng-Xiang He (Ph.D. 1990, Hawaii), working with Professor Samsen; astrophysicist Shao H. Hu (Ph.D. 1989, London), working with Professor Simon; Allgiey Kosor (Ph.D. 1977, Arch F. Joffe Physical-Technical Institute, Leningrad, USSR), working with Professor Sellmyer; experimental atomic physicist Kuan-Mee Lee (Ph.D. 1989, Nebraska), working with Professor Simon; experimental atomic physicist Robert Moberg (Ph.D. 1990, Uppsala, Sweden), working with Professor Simon; experimental condensed matter physicist Anthony S. Novak (Ph.D. 1990, Kansas State), working with Professor Sellmyer; theoretical atomic physicist Zhang Han (Ph.D. 1988, Virginia), working with Professor Starace; experimental condensed matter physicist Brian Patterson (Ph.D. 1991, Delaware), working with Professor Sellmyer; experimental condensed matter physicist Zhenggang Zhou (Ph.D. 1990, Nebraska), working with Professor Sellmyer; and experimental atomic physicist Qianyu Yen (Ph.D. 1986, Nebraska), working with Professor Jacobs.
1990 Fall Semester Colloquia

September 6: Dr. Reifk Kortan, AT&T Bell Laboratories
"Quasicrystals: Seeing in Believing"

September 18: Professor M. Eugene Rudd, University of Nebraska-Lincoln
"Early History of Physics and Astronomy at the University of Nebraska"

September 20: Professor S. N. Khanna, Virginia Commonwealth University
"Magnetism in Low Dimensional Systems"

September 27: Professor Vladimir Prinz, Inst. of Crystallography, Academy of Sciences, USSR
"Bulk Photovoltaic Effect in Ferroelectric & Piezoelectric Materials"

October 4: Professor Marshall Onsion, University of Wisconsin-Madison
"Photoemission Experiments in Condensed Matter Physics"

October 11: The Jerry E. Rockman Lecture Dr. Sheila Tohian, University of Arizona
"They Are Not Dumb, They Are Just Different—Stalking the Second Tier"

October 18: Professor Steven T. Manson, Georgia State University
"New Frontiers in the Interaction of Radiation with Matter: Opportunities Presented by High-Brightness Light Sources"

October 25: Professor Dimitri Mihalas, University of Illinois-Urbana-Champaign
"New Radiative Opacities for Stars"

October 28: Dr. Randall L. Hendrick, AT&T Laboratories
"Two-Dimensional Systems in Semiconductors Created by Doping"

November 8: Professor James L. Lawler, University of Wisconsin-Madison
"Optoelectronic Studies of Discharge Plasma Sheaths"

November 12: Dr. Stephen Ducharme
"Improved Photorefractive Materials"

November 29: Professor Eric Davies, University of Nebraska-Lincoln
"Wound Signals in Plants: Are They Electrical?"

December 6: Professor Roger Kirby, University of Nebraska-Lincoln
"Fourier Transforms in Physical Measurements: Life in K Space"

1991 Spring Semester Colloquia

January 17: Professor Theodore P. Jorgensen, University of Nebraska-Lincoln
"Can The Quantum Equation Be Derived From Classical Physics?"

January 24: Professor David J. Sellmyer, University of Nebraska-Lincoln
"Magnetism and Magneto-Optics of Nano-structured Multilayers"

February 7: Professor Dennis R. Alexander, University of Nebraska-Lincoln
"Non-linear Laser Interactions With Aerosol Droplets"

February 14: Professor C. L. Cocks, Kansas State University
"The Interaction of Slow Highly Charged Ions with Electrons, Atoms, and Surfaces"

February 21: Dr. Robert B. Van Dover, AT&T Bell Laboratories
"High-Temperature Superconductors: Where Do We Stand?"

February 28: Dr. Randall Vickers, Eastman Kodak Co.
"Calculated Magnetic and Electronic Properties of Superlattices Magnetic-Optic Media"

March 7: Professor Lincoln Wolfenstein, Carnegie-Mellon University
"Massive Neutrinos and the Solar Neutrino Problem"

March 14: Professor Walter E. Kauppila, Wayne State University
"Cross-channel Coupling Effects in Positron-Atom Scattering"

April 4: Dr. Richard G. W. Keeling, York University, U.K.
"The Story of Isaac Newton's Apple Tree"

April 11: Professor David J. Pegg, University of Tennessee
"Negative Ions: Fragile Quantum Systems"

April 18: Professor Owen Gingerich, Harvard University
"Circles of the Gods: Copernicus, Kepler and the Ellipse"

April 25: Professor Virginia Trimble, University of California-Irvine
"The Universe You Don't See: Existence and Nature of Dark Matter"

May 9: Dr. Donald P. Schneider, Institute for Advanced Study, Princeton
"Scanning for Violence at the Edge of the Universe"
## New Research Grants and Contracts

During the period 1 November 1990-31 October 1991 the following new and renewal external grants and contracts were received by our faculty:

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title (Source of Funds)</th>
<th>Amount ($)</th>
</tr>
</thead>
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<tr>
<td>P.D. Burrow</td>
<td>Electron Scattering Studies of Temporary Anion Formation in Hydrabridos (NSF)</td>
<td>$ 77.0</td>
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<tr>
<td>D.W. Duguetin</td>
<td>Laser Photoinitation Studies of Excited Atomic States (NSF)</td>
<td>$ 49.1</td>
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<tr>
<td>I.I. Fabrikant</td>
<td>Atomic Processes Involving Negative Ions (NSF)</td>
<td>$ 42.5</td>
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<tr>
<td>R.G. Fuller</td>
<td>Bridges, Bicycles, and Traffic (Thematic Physical Science Lessons NSF)</td>
<td>$ 41.6</td>
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<tr>
<td>R.G. Fuller</td>
<td>Every Physics Teacher's CD-ROM Toolkit (NSF)</td>
<td>$469.1</td>
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<td>R.G. Fuller</td>
<td>National Interactive Media Project for Secondary Physical Science (Department of Education)</td>
<td>$ 55.0</td>
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<td>R.G. Fuller</td>
<td>Transforming Physics Content Using New Technologies (NSF)</td>
<td>$ 56.5</td>
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<td>R.G. Fuller</td>
<td>Transforming Physics Laboratories Using New Technologies (NSF)</td>
<td>$ 29.9</td>
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<tr>
<td>R.G. Fuller</td>
<td>Using New Technologies to Teach Physics (NSF)</td>
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<tr>
<td>J.R. Hardy</td>
<td>First Principles Theoretical Studies of Ferroelectric Lattice Instabilities (GNK)</td>
<td>$100.0</td>
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<td>J.R. Hardy</td>
<td>Studies of Ionic Molecular Solids (ABO)</td>
<td>$100.0</td>
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<tr>
<td>D.H. Jaques</td>
<td>Novel Techniques for Studying Fundamental Three Body Interactions (UN Foundation)</td>
<td>$ 33.2</td>
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<td>R. Katz</td>
<td>Theory of Optical Properties of Novel Artificially-Structured Materials (NSF)</td>
<td>$ 48.0</td>
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<td>R.D. Kirsh</td>
<td>Magneto-Optical Properties of Novel Artificially-Structured Materials (Research Corp.)</td>
<td>$ 20.0</td>
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<td>K.C. Leung</td>
<td>A 25th Anniversary Conference on Binary Star Astronomy (NSF)</td>
<td>$ 34.0</td>
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<td>S.H. Liu</td>
<td>Magneto-Optical Properties of Novel Artificially-Structured Materials (NSF)</td>
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<td>S.H. Liu</td>
<td>Superconductivity (NASA)</td>
<td>$ 24.7</td>
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<table>
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<th>Principal Investigator</th>
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<tr>
<td>M.E. Rush</td>
<td>Ionization Processes in Atomic Collisions (NSF)</td>
<td>$360.5</td>
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<tr>
<td>J.A.K. Samson</td>
<td>A Rare Gas Optics-Free Absolute Photometer (University of California)</td>
<td>$ 57.6</td>
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<td>J.A.K. Samson</td>
<td>Interaction of Radiation with Planetary Gases (NASA)</td>
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<td>Photoinitation Studies of Atoms (NSF)</td>
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<td>J.A.K. Samson</td>
<td>Ultraviolet and X-ray Backscatter of Planetary Atmospheres (NSF)</td>
<td>$ 60.0</td>
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<td>K.G. Schmidt</td>
<td>Survey of Poorly Studied Variables (NSF)</td>
<td>$ 54.5</td>
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<td>D.J. Sellmyer</td>
<td>Fundamental Studies of Strongly Magnetic Rare Earth-Transition Metal Alloys (DOE)</td>
<td>$ 60.0</td>
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<td>D.J. Sellmyer</td>
<td>Magneto-Optical Properties of Artificially-Structured Materials (NSF)</td>
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<td>D.J. Sellmyer</td>
<td>Midwest State Conference</td>
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<td>N.R. Sinon</td>
<td>A Test of New Radiative Capacities Their Incorporation into Improved Pumped Laser Models (NASA)</td>
<td>$130.3</td>
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<td>A.P. Stace</td>
<td>Dynamics of Collision Processes (DOE)</td>
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<td>A.P. Stace</td>
<td>Dynamics of Photon-Atom Interactions (NSF)</td>
<td>$ 52.0</td>
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<td>A.P. Stace</td>
<td>XVII International Travel Grant (NSF)</td>
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<td>J.W. Waymuth</td>
<td>Magnetic Survey: L.A.C. Lower Fortage (Canyon Site, Western History Research)</td>
<td>$ 7.0</td>
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<td>J.W. Waymuth</td>
<td>Quarry Creek Survey (University of Kansas)</td>
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<td>J.W. Waymuth</td>
<td>St. Catherine’s Island Survey (American Museum of Natural History)</td>
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**TOTAL:** $2,499.0 K