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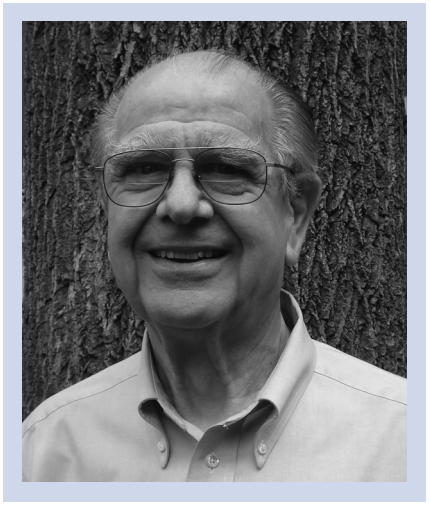
Bascom S. Deaver Jr. Undergraduate Scholarships in Physics

For more than forty years Bascom Deaver has been an inspiration to countless students, both undergraduate and graduate, at the University of Virginia. A professor is supposed to demonstrate teaching, research, and service. Professor Deaver exemplifies this ideal, and for this reason, the Department of Physics is honoring him with our primary undergraduate scholarships for physics majors. The department has no general scholarships available for undergraduate majors. The department has already received pledges of more than $100,000 from the physics faculty and Deaver's friends, family, and former graduate students. We are now asking all physics alumni to contribute to this scholarship endowment fund. Funds can be contributed over a three-year period.



Much of Deaver's instructional effort has been concentrated on our undergraduate program, with spectacular results. He is both a superb classroom lecturer and a creative laboratory instructor. His teaching has resulted in several recognitions including the ACT-NUCEA Award for Innovations in Continuing Education in 1988, the All University Teaching Award in 1994, the George B. Pegram award of the Southeastern Section of the American Physical Society for excellence in teaching in 2000, and the UVa Alumni Association Distinguished Professor Award in 2004.

An important part of the teaching in a university occurs in the research laboratories where students undergo the transformation from assimilating knowledge to generating new knowledge. This transformation occurs under the guidance of the professor in whose laboratory the work is done. Bascom has supervised many students, including 11 masters students, 26 Ph.D. students, countless undergraduates, and 29 engineering graduate students jointly with Robert Mattauch, Robert Weikle, Thomas Crowe, and Arthur Lichtenberger. A measure of his success is that his students have founded companies and become faculty members at research universities including Stanford, Vanderbilt, and Harvard.

Deaver's research has been focused on superconductivity and its applications. His research began with his Ph.D. work at Stanford, where his thesis experiment was the discovery that the magnetic flux threading a superconducting ring is quantized. This experiment provided the first experimental evidence for the pairing of electrons in superconductors predicted by the Nobel Prize winning work of Bardeen, Cooper, and Schrieffer. The quantum flux was quickly recognized as a fundamental property of superconductors, and as a result of this work, Deaver is known all over the world. After coming to the University of Virginia, Deaver continued his basic research on superconductivity and went on to explore its applications. Deaver and his students did significant research on flux quantization and developed superconducting magnetometers, which have had important applications. Deaver has gone on with others to build devices such as extraordinarily sensitive microwave diodes for receivers and superconducting tunnel junction diodes. These diodes are found in radio telescopes around the world.

There is no question that Bascom Deaver is responsible for the tremendous success of our undergraduate program, and he has worked tirelessly to ensure that it is first rate. Under his direction we have developed two undergraduate concentrations, in computational physics and optics, and we have inaugurated a B.A. program which is designed for students who are not planning to

See *Scholarships* on page 2.

Letter from the Chairman

Dear Alumni & Friends
of the Physics Department,

It gives me pleasure to bring you news of our recent developments. Christopher Neu, an experimental high-energy physicist, has accepted our offer of appointment as Assistant Professor of Physics. Chris, as well as Israel Klich, a condensed-matter theorist, are set to join our faculty in the fall of 2008. As you can see from the accompanying list, several of our students and faculty have lately received awards and recognition for their outstanding contributions. We congratulate them all, and look forward to another fine year for the department.

Dinko Počanić

Scholarships (continued)

pursue physics as a career but would like to experience the intellectual excitement of physics. The B.A. program exposes students to the intellectual beauty of physics without sophisticated mathematics. It is the perfect major for a student who is interested in physics but wishes to attend, for example, law school.

He helped launch our present program to train high school physics teachers, an activity which addresses one of the chronic problems producing sufficient numbers of high school physics teachers. Recognition of his dedication to University service has included, in addition to several teaching awards mentioned earlier, membership in the Raven Society and the Harrison Award for Undergraduate Advising in 1999. He has directed the undergraduate program as the Associate Chair for the Department of Physics for more than 25 years.

The department will be sending a letter asking for funds for the Deaver scholarship in the near future. For more information go to our website at *http://www.phys.virginia.edu/Announcements/DeaverFund/*. The pledge form is at *http://www.phys.virginia.edu/Announcements/DeaverFund/DeaverPledgeForm.pdf*.

Honors and Awards

Undergraduate Students

The James S. Elkins, Sr. award is given annually to the most outstanding physics undergraduate major. The 2008 award is shared by **Nicole Fields** and **Thiparat Chotibut**.

Douglas O'Reagan won the first annual Outstanding Undergraduate Physics Research Award given in 2007. Doug's research, done under Professor Cass Sackett's mentorship, was entitled "Active Magnetic Field Cancellation for Bose-Einstein Condensate Experimentation". Doug graduated in 2007 and is now in graduate school at UC Berkeley.

Graduate Students

The departmental outstanding teaching award for 2008 was given to **Kosta Popovic**.

Faculty

Robert Jones received an All University Teaching Award.

Seunghun Lee was the recipient of the 2008 Science Prize of the Neutron Scattering Society of America.

Peter Arnold, Thomas Gallagher, Robert Jones, and **Joseph Poon** received an Outstanding APS Referee Award for 2008.

Faculty News

Promotions

Paul Fendley and **Peter Arnold** were promoted to Full Professor.

Seunghun Lee, **Nilanga Liyanage**, **Cass Sackett**, and **Jongsoo Yoon** were promoted to Associate Professor with tenure.

Simonetta Liuti was promoted to Research Associate Professor.

New Faculty

The following were hired as Assistant Professors:

Stefan Baeßler, Experimental Nuclear and Particle Physics

Christopher Dawson, Theoretical Nuclear and Particle Physics

Austen Lamacraft, Theoretical Condensed Matter Physics

Diana Vaman, Theoretical Nuclear and Particle Physics

New Faculty Spotlight

Stefan Baeßler

Stefan Baeßler comes to us from Germany where he received his degrees from Heidelberg. He is an expert in doing fundamental measurements using the tools of nuclear physics. Before joining the Physics Department at UVa, he worked as Scientific Assistant at the University of Mainz. He was at the University of Washington from 1997-99 doing a precise test of the strong equivalence principle of general relativity. Recently, he has been developing a neutron decay spectrometer aSPECT, which he hopes to bring to the Spallation Neutron Source (SNS) at Oak Ridge National Lab. In addition, Baeßler set up a test beam line at the TRIGA reactor at Mainz to measure and optimize the ^{3}He polarization of the Mainz polarizer.

Baeßler is filling a new position that is jointly supported by UVa and the ORNL SNS. It is a unique venture, because the SNS represents the opportunity to do not only materials research, but also fundamental physics research using neutron beams. He will participate in the upcoming experiments at the fundamental physics beam line, primarily in the neutron beta decay spectrometers. He brings considerable experience to UVa and ORNL, including experiment design, calibration sources, detectors, and neutron polarization measurements.

He also continues his study of gravitational bound states of ultracold neutrons (the GRANIT experiment) which is being installed in Grenoble, and in the test of Lorentz invariance being performed in Berlin. The latter experiment will use the free precession of polarized ^{3}He (with the relaxation time of many days) as the atomic clock. The same apparatus might later be used in the search for axions.

Chris Dawson

Chris Dawson received his education in England (United Kingdom) at the Universities of Durham and Southhampton before coming to the US in 1998 where he joined Brookhaven National Lab as a research fellow and later as a RIKEN fellow. He is a theoretical particle physicist with expertise in lattice QCD, which has applications to the nuclear and particle physics program at Jefferson National Lab in Newport News.

His research has been primarily in the area of lattice QCD. Testing the Standard Model of Particle Physics requires quantitative control over the strong force, and the goal of lattice QCD calculations is to provide this. Dawson's interests span from developing improved algorithms to the calculation of direct phenomenological interests.

He has been involved in using 10 teraflop supercomputers to do full QCD calculations. This includes working on the analysis of the meson spectrum, decay constants, and matrix elements relevant to kaon-beta decay, and the calculation of the needed renormalization.

Austen Lamacraft

Austen Lamacraft recently joined the faculty as an assistant professor in theoretical condensed matter. He grew up in England and received all his degrees at Cambridge. In addition to his Ph.D. in theoretical physics, he has a masters degree in mathematics. He did postdoctoral work at Princeton as a Dicke fellow and at Oxford before coming to Virginia last semester.

Much of his present research concerns the theoretical description of quantum liquids, a catch-all term for a range of systems whose physical properties defy classical expectations, and includes the normal and superconducting states of electrons in ordinary metals, as well as the superfluid phases of liquid helium.

For many years the study of quantum liquids was confined to the laboratories of low-temperature physics, but the last decade has seen extraordinary experimental advances in the creation of quantum degenerate gases of bosonic and fermionic atoms. The majority of Lamacraft's current research is a response to this remarkable progress. His recent work has explored the phase diagram of polarized Fermi condensates, and dynamical phenomena in magnetic Bose gases.

Please send comments and suggestions about the newsletter to

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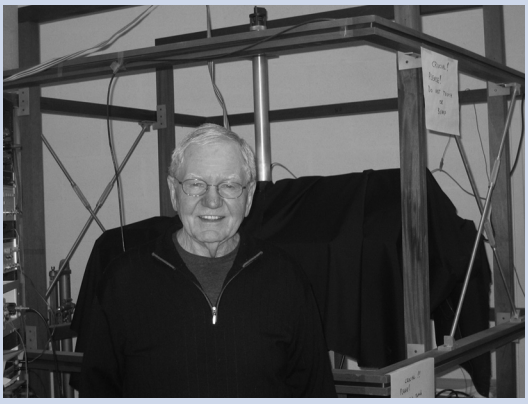
A Man of Many Talents



Rogers Ritter came to the University in 1961 as an experimental nuclear physicist after doing his dissertation research at Oak Ridge National Laboratory. He worked on both the 1 MV and 5.5 MV Van de Graaff accelerators at UVa for a number of years.

After hearing the legendary Jesse Beams give a talk in 1973 about his gravitation research, Ritter made some suggestions, and Beams, knowing that he would retire soon, encouraged Ritter to join him in his investigation of the time rate of change of the gravitational constant G, an effect suggested by Dirac. Ritter and Beams worked together for 3-4 years before Beam's death in 1977. Ritter has continued working in the field ever since, including after his retirement in 2000. Much of this work has been together with George Gillies, a former student. Ritter developed rotation devices and was able to place a new limit on the mass of the hypothetical particle axion. He has also made significant contributions to the fundamental physical constants, often clarifying them in numerous talks and papers. Ritter and Gillies are still performing an intrinsic spin quadrupole measurement in the basement of the physics building looking for dark matter having axionic spin character. Ritter is standing in front of the apparatus in the above photo. Ritter says he is about two years behind in analyzing the data!

Ritter's significant foray into medical physics had its beginning in 1961 when he met Norman Zinner, a UVa urology resident. They have jointly published some 30 research papers and still ski together every spring.

By 1984 Ritter was well known in the medical field and was often approached by UVa medical staff for help. Matt Howard, a UVa 4th year medical student, approached Ritter about a less invasive method of treating brain tumors. They inserted tiny magnetic beads into the brain and moved them around using magnetic fields. By using inductive heating and rastering the magnetic bead in the tumor, it would be destroyed. A patent was filed in 1988 for the device, and the video tumor fighter was born. They tried later to deliver drugs to the tumor using the magnetic bead. The company Stereotaxis was formed by Ritter and others in Livermore, CA to develop this device and later cardiac intervention devices using similar remote control magnetic navigation procedures. By now Ritter has some 30 patents, almost half of them singly in his name. Another 50 patent applications are pending.

And if all this is not enough, Ritter is presently seeking venture capital support to start another company based on a new idea that he has for magnetic navigation in the human body. If you have a few bucks, you may want to contact him. He still lives in the same house outside Charlottesville with his wife Diane where they threw those fabulous parties!