BERKELEY ASTRONOMY

University of California 2012

FROM THE CHAIR'S DESK…

Since my term as Chair of the Department of Astronomy started on 1 July 2010, there hasn't been a dull moment – there were many ups and downs, though.

We all were extremely pleased with the 2010 National Research Council (NRC) rankings of Ph.D. programs across the nation, as our Astronomy Department came out as number one (in a close tie with Caltech). At the same time, however, we were dealing with the loss of an eminent faculty member. Donald C. Backer, Professor of Astronomy and Director of the Radio Astronomy Laboratory, died unexpectedly in July 2010 after collapsing outside his home. A memorial service held several days later was extremely moving, with colleagues, former students, and friends from all over the country coming to pay their respects and share memories. As a lasting tribute to Don, a fund to support graduate students has been established in his memory (see p. 7).

After being on the faculty for 38 years – including 9 years as Chairman – Jon Arons retired in July 2010. We celebrated the start of his new life as an Emeritus Professor with a workshop in his honor in January 2012. We anticipate seeing Jon frequently as he continues his participation in the department as a "Professor in the Graduate School."

The department received approval to search for an additional new faculty member, and I am pleased to report that we attracted two new outstanding and enthusiastic Assistant Professors: Aaron Parsons and Mariska Kriek (see p. 3). I am delighted to welcome them to our department.

Other faculty remain in high standing and continue to be recognized at international levels. The 2011 Peter and Patricia Gruber Foundation Cosmology Prize was awarded to Marc Davis and his "Gang of Four" (see p. 5). Alex Filippenko's role in the research on the accelerated expansion of the universe, which earned the 2011 Nobel Prize in Physics, is described on p. 4.

Many of our faculty members continue to make headlines in the news. Geoff Marcy, famous "exoplanet" hunter and member of the Kepler team, was recently in the news when that group announced the discovery of the first Earth-sized planets. Josh Bloom, together with his team, connected a powerful gamma-ray burst to a black hole "feasting" on a star. Peter Nugent discovered a supernova, the closest ever to Earth, within hours of its explosion through real-time analysis of data taken with the Palomar Transient Factory (PTF). More recently, Chung-Pei Ma's team announced the discovery of the most massive black hole to date, at a hefty 10 billion solar masses.

Our graduate students and undergraduate majors continue to thrive, and our postdoctoral program is one of "the strongest assets of the Department", according to the External Review Committee in 2008. This past year we had close to two dozen postdocs, including Hubble, Einstein, Jansky and Berkeley Miller Fellows. Thanks to the generosity of donors to our Friends of Astrophysics Postdoctoral Fellowship Fund, we continue to attract the best postdoctoral fellows to our Department.

We are also pleased to announce a new award for graduate students: the Robert J. Trumpler Graduate Student Excellence Award, nicknamed the "Berkeley Trumpler Award." The first recipient of the Award was announced during our traditional holiday party (see p. 5). This past year, 16 students graduated with a Bachelor's after majoring in Astronomy, and four students received their Ph.D. Of those, Daniel Perley accepted a postdoctoral position at Caltech, Linda Strubbe accepted a position at the University of Toronto, Jeffrey Silverman decided to continue his research at Berkeley, and Charles Hansen is now a software developer at Pivotal Labs in San Francisco. Five new students joined our graduate program this year.

After a full year of preparation, the Big Move out of Campbell Hall became a reality, something that had been anticipated for over 15 years. Our new temporary home is in Hearst Field Annex (HFA), buildings B, C and D. After their previous occupancy, these temporary buildings (designed by UCB Architecture faculty as campus surge space) were remodeled to fit most of our needs.

Continued on page 2

***Chair's Desk** from page 1*

Since HFA could not house all of Astronomy, the electronics shop, digital lab, and the new Aaron Parsons lab, moved to Evans Hall, joining the TALC and Bloom labs. The machine shop and cryo lab moved to LeConte. Our highly valued and premier Undergraduate Lab (originally started by David Cudaback) moved to HFA to encourage continued interaction with members of our department. Our optical telescope from the roof of Campbell was put in storage, and two small portable telescopes were purchased to use for teaching during the coming years. The radio telescopes are being moved to the roof of Wurster Hall.

On 29 November 2011 funding for the construction of New Campbell Hall became a reality. At the time of this writing, Old Campbell Hall is shrink-wrapped and abatement has started. In early March 2012 demolition will start. One of our eminent (emeriti) faculty, Harold Weaver, will have the rare honor of being present for both the construction (he helped plan the building at the time) and, now, demolition of Old Campbell Hall. Construction of New Campbell Hall will commence in May 2012, with an anticipated date of completion in September 2014. In addition to the marvelous suspended pedestrian bridge connecting New Campbell Hall to Le Conte, another highlight of the new building will be our rooftop observatory. The observatory will be surrounded by a patio and will be adjacent to a small meeting room for lectures (see p. 6). There are still giving opportunities available, so please let me know if you are interested in making a contribution.

***Imke de Pater** is a planetary scientist specializing in radio and infrared observations of planets, including their magnetic fields, satellites and ring systems.*

GIVING TO BERKELEY ASTRONOMY

As state support becomes more limited, we increasingly rely on alumni and friends to maintain our intellectual leadership in Astrophysics and Cosmology. Your contribution can endow a professorship, provide student support, fund cutting-edge research, or outfit dedicated facilities– all of which are critical. If you would like to learn more about how you can contribute to Berkeley Astronomy, please visit our website, http://astro.berkeley.edu/support.html, or contact Department Chair Imke de Pater at imke@berkeley.edu. In addition to our "Friends of Astronomy" discretionary fund, current priorities include the Donald C. Backer Endowed Memorial Student Support Fund, the Friends of Astrophysics Postdoctoral Fellowship Fund, and new Campbell Hall. All of us in the Department of Astronomy thank you for your generosity!

GEOFF MARCY APPOINTED TO ALBERTS CHAIR

Astronomy Professor Geoff Marcy has been appointed the next Watson and Marilyn Alberts Chair in the Search for Extraterrestrial Intelligence (SETI). The Alberts, who have long held an interest in SETI-related research, established the chair in 1998. It is the first-ever endowed chair that supports the search for extraterrestrial intelligence. "This chair ensures that SETI research will continue to be vigorously pursued at Berkeley, inspiring future generations of scientists to advance the field," states Watson Alberts.

"It is a great honor to be appointed to the Alberts Chair," says Marcy, a leading astrophysicist in the detection and characterization of exoplanets. "The discovery of extrasolar planets has spawned the search for Earth-like, habitable worlds and for life in the universe. Our recent discoveries will inevitably lead us to more SETI-related work as we find increasing numbers of potentially habitable planets. It is an extremely exciting time to be in this field."

Marcy has been a pioneering "planet hunter" since the 1980s, when few scientists believed in the quest to find extrasolar planets. Marcy and his collaborators have discovered and studied over 250 extrasolar planets, including the first multiple planet system (Upsilon Andromedae), the first Saturn-size planet, and the first Neptune-size planet. He is a co-investigator on the NASA Kepler telescope discovery team that, since 2009, has detected more than 2000 possible planets along the "Orion Spur" of our Milky Way galaxy.

Professor Marcy's appointment to the Alberts Chair coincides with exciting news in his own work– news relevant to SETI research. In December 2011, the Kepler team announced the detection of "Kepler-22b," the first planet that the NASA telescope has confirmed in the "habitable zone" of a star very similar to our own. They also announced discovery of the first five Earth-size planets around sun-like stars (Kepler 20 e and f and KOI 961 b,c,d), one being the size of Mars.

In recent months, Marcy has begun work on new SETI-related projects. In collaboration with Andrew Howard, he is searching for laser beams emitted by advanced civilizations by taking spectra of nearby stars and galaxies. He is also searching for signs of Dyson spheres in the brightness variations of nearby stars.

"I couldn't be more pleased about the support this appointment provides me and my team. As we continue to search for habitable planets, we will also seek methods to detect signals

from extraterrestrial intelligence. This appointment will assist me in developing that research and will allow me to support and involve dynamic emerging astronomers, who will continue this work long into the future."

The Alberts are both Berkeley alums, Watson holding a Ph.D. in Biophysics and Marilyn a B.A. in English. The two have been involved in SETI work for many years. Watson has volunteered for the University's SETI-related project, SERENDIP, which analyzes radio signals picked up by its telescope in Arecibo, Puerto Rico. The couple has also supported the SERENDIP project.

"We are very excited about Geoff's appointment to the chair," states Marilyn. "Our interest in SETI has been steady over the years, and it has been thrilling to watch Geoff's work bring him closer and closer to finding habitable, and therefore potentially life-supporting, planets in the universe."

Geoff Marcy *is a Professor of Astronomy at UC Berkeley and an Adjunct Professor of Physics and Astronomy at San Francisco State University. He is the Director of Berkeley's "Center for Integrative Planetary Science," a research unit designed to study the formation, geophysics, chemistry and evolution of planets. He is also a co-investigator on the Kepler team.*

NEW ALUMNI CHALLENGE

The New Alumni Challenge, which has been a resounding success, is back for a third year! Don't miss your chance to double your impact and join the next generation of alumni who are committed to keeping the Department of Astronomy the best in the world!

The challenge is open to all undergraduate and graduate alumni from the Classes of 2007 through 2011, plus all students who will graduate in Spring 2012. Your gifts (up to $1,000 per donor) will be doubled. That means a gift of $50 will equal $100 for our department, while $1,000 will increase to $2,000. Even small contributions will go a long way!

This is a campus-wide campaign, but we hope you will choose to support the Department of Astronomy. You may direct your gift to one of our specific programs (listed on the Support Astronomy page of our website) or make a general donation to the Department. However you choose to support Cal, your contributions will also count toward The Campaign for Berkeley, a landmark fundraising effort to sustain Cal's excellence for future generations.

Thanks to Berkeley alumni Paul and Stacy Jacobs for making this challenge possible. More than 5,000 alumni contributed over $680,000 during last year's challenge. Please help us make this year's challenge an even bigger success.

WELCOME NEW FACULTY MEMBERS

We have added two new faculty members in the 2011-2012 academic year. Aaron Parsons joined our faculty in summer 2011 as an Assistant Professor. He received his bachelor's degree in Physics from Harvard, and his Master's and Ph.D. from UC Berkeley in 2009—so he's certainly no stranger to the Department! His research interests include the formation and evolution of large-scale cosmic structure, star formation in the early universe, measurement of cosmological parameters, and radio astronomy instrumentation. As a postdoctoral fellow, Aaron worked closely with previous department Chair and Director of the Radio Astronomy Lab, Don Backer, on the Precision Array to Probe the Epoch of Reionization (PAPER), built in incremental stages both in Green Bank (West Virginia) and in South Africa.

Our other new faculty member, Mariska Kriek, joined the department as an Assistant Professor in January 2012. She received her Master's and Ph.D. cum laude from Leiden University. A native of the Netherlands, Kriek has lived in the US since 2007— first as a H.N. Russell Fellow at Princeton University, then as a Clay Fellow at the Harvard Smithsonian Center for Astrophysics. Her research interests are the origin and evolution of galaxies, primarily from an observational perspective. She is currently involved in several large galaxy surveys, including the NEWFIRM Medium-Band Survey and 3D-HST (a spectroscopic survey with HST).

BERKELEY'S ROLE IN THE 2011 NOBEL PRIZE RESEARCH

On October 4, 2011, the Royal Swedish Academy of Sciences announced the recipients of the Nobel Prize in Physics: Saul Perlmutter (UC Berkeley and LBNL), Brian P. Schmidt (Australian National University), and Adam G. Riess (Johns Hopkins University). By measuring the expansion history of the Universe through observations of exploding stars known as a "Type Ia supernovae," they found that the expansion is currently speeding up with time, rather than slowing down as would have been expected under the influence of attractive gravity alone. The phenomenon has been confirmed by other techniques but the cause is unknown; either mysterious, repulsive "dark energy" pervades all of space and makes up 73% of the total matter/energy content of the Universe, or there's a problem with Einstein's general theory of relativity on large scales. Many scientists think this is the most important observationally motivated problem in all of physics, and it provides crucial clues to the long-sought quantum theory of gravity.

Two teams made the prize-winning discovery in 1998: the Supernova Cosmology Project, led by Perlmutter, and the High-Redshift Supernova Search Team, led by Schmidt. Adam Riess, a Miller postdoctoral research fellow at Berkeley at that time, was working with Astronomy Professor Alex Filippenko; Riess analyzed the high-redshift data, and was the first on Schmidt's team to realize the implications of their observations. Since the Nobel Prize can be shared by three individuals at the most, the two team leaders, as well as Riess, were recognized.

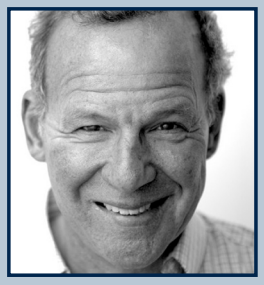
While these three men received the prize for this extraordinary discovery, a total of 51 scientists contributed significantly to the research, including Filippenko. He was initially on Perlmutter's team, but later switched to Schmidt's team, and was the only person to have coauthored both discovery papers (A. G. Riess, A. V. Filippenko, et al. 1998, *The Astronomical Journal*, 116, 1009-1038, "Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant'' & S. Perlmutter, et al. 1999, *The Astrophysical Journal*, 517, 565-586, "Measurements of Omega and Lambda from 42 High-Redshift Supernovae''). Filippenko's primary role was to obtain and classify spectra of the distant supernova candidates with the Keck 10-meter telescopes in Hawaii and to measure their redshifts. In earlier research, Filippenko had conducted studies of nearby Type Ia supernovae, showing significant variations among them which need to be accounted for when using them as cosmological distance indicators.

Filippenko could not be more proud of what was accomplished here at Berkeley: "I am enormously happy that our work led to a fundamental breakthrough in physics that was worthy of the Nobel Prize, and I offer my heartfelt congratulations to the three winners. Together with almost all of the other team members, I celebrated with Adam, Brian, and Saul in Stockholm the week of December 6, 'Nobel Week.' I'm very proud that much of the work was done at UC Berkeley, by both teams; the Nobel Prize brings great honor and recognition to our University. I couldn't have imagined, decades ago, that I would be involved in such important research; it has truly been a rare and amazing privilege, and I feel extremely fortunate."

The High-z Supernova Search Team ("z" stands for redshift), right after the awarding of the Nobel Prize in Stockholm. Left to right: Craig Hogan, Robert Kirshner, Christopher Stubbs, David Reiss, Chris Smith, Alex Filippenko, Alan Diercks, Adam Riess (Nobel Laureate), Jason Spyromilio, Alejandro Clocchiatti, Mark Phillips, Brian Schmidt (Nobel Laureate), Ronald Gilliland, Bruno Leibundgut, Nicholas Suntzeff, Saurabh Jha, John Tonry, Peter Garnavich, Peter Challis. Not pictured: Robert Schommer (deceased).

AWARDS

MARC DAVIS RECEIVES GRUBER AWARD



Marc Davis, longtime Professor of Astronomy and Physics at UC Berkeley, was awarded the 2011 Peter and Patricia Gruber Foundation Cosmology Prize for computer simulations he and his collaborators developed 30 years ago that convinced the world of the existence of "dark matter."

Davis shared the $500,000 prize with George Efstathiou, Director of the Kavli Institute for Cosmology in Cambridge, England, Carlos Frenk, Director of the Institute for Computational Cosmology at Durham University in England, and Simon White, Director of the Max Planck Institute for Astrophysics in Garching, Germany.

The foundation cited the four scientists "for their pioneering use of numerical simulations to model and interpret the large-scale distribution of matter in the Universe." The work by Davis, Efstathiou, Frenk and White, most of which was conducted at UC Berkeley, "galvanized support for 'cold dark matter' as the dominant form of matter in the Universe and has thus been instrumental in the crafting of our current cosmological paradigm," the foundation said in a statement. The Gruber Prize recognizes the discovery method that the team introduced, as well as the collaboration's subsequent discoveries. Davis and the other prize recipients were honored in a ceremony this past October in Munich, where they received gold medals and delivered a lecture.

In the late 70's, while he was a junior professor at Harvard, Davis surveyed 2,400 galaxies and discovered that the Universe wasn't just a uniform scattering of galaxies but rather a "cosmic web" of galaxies grouped into filaments, separated by vast voids. "At the time, nobody had any idea what the large-scale distribution of matter was, and mostly we didn't think about it," Davis said. "I soon saw that the best mathematical model of the Big Bang we had was wrong. There was a complete disconnect between our observations and the theory. At that point," he said, "I became convinced that the only alternative was simulations," that is, computer calculations of how thousands of galaxies move under the influence of gravity, with dark matter thrown into the mix."

Davis then teamed up with White, Frenk, and Efstathiou, referred to as the DEFW collaboration, nicknamed the "Gang of Four." They produced simulations that ruled out hot and warm dark matter but showed that cold dark matter produced the clumps, filaments, and voids that were observed in space. "That was the clincher," Davis said. "We said that the universe looks like it is dominated by cold dark matter, and everybody was convinced after that."

Since his work on dark matter, Davis has been involved in several projects including a survey of 50,000 galaxies at redshifts $z \sim 1$, called DEEP2, performed with the Keck Telescope in Hawaii. "The DEEP2 survey has proved the starting point for many subsequent observations and astronomy missions in space," he said.

Davis has since been working with teams of astronomers doing observations of the galaxies in the fields of the DEEP2 survey at other wavelengths. Despite suffering a stroke almost nine years ago, Davis continues to teach, research, and participate in his two favorite hobbies: skiing and biking.

NEW BERKELEY TRUMPLER AWARD

The Astronomy Department is delighted to announce an exciting award to support high-achieving graduate students in our department. The Robert J. Trumpler Graduate Student Excellence Award (the "Berkeley Trumpler Award") was made possible through a generous gift from a former Astronomy graduate student, Martha Stahr Carpenter (M.A. 1943; Ph.D. 1945). For her Ph.D. thesis, Stahr-Carpenter made observations and measured radial velocities of F and G stars near the North Galactic Pole in an effort to investigate the gravitational force within the Milky Way Galaxy. From pioneering radio-wave observations, she also found and measured tilting of the central plane of the galaxy.

This award is named in honor of her thesis advisor, the late Robert J. Trumpler, a Professor in the Astronomy Department from 1938-1951. Trumpler's most important work was his study of distances, dimensions, and space distribution of galactic star clusters. From this investigation he demonstrated that interstellar space is filled with a tenuous haze of dust and gas that scatters and absorbs starlight. Trumpler's discovery of the phenomenon of interstellar extinction marked a great step forward in our understanding of the Milky Way galaxy and the Universe.

The new Berkeley Trumpler Award will be given to one or more high-achieving graduate students per year in recognition of academic excellence. In addition to a student's academic achievements, the award winner(s) will also have demonstrated an outstanding record of involvement in the department or wider astronomical community. Funds from the prize are to be used to fully or partially support travel for field trips and observing, attendance at a professional conference or workshop, or for other approved purposes.To be considered for the award, students must have passed their qualifying exam and be nominated by a faculty member in the department. From those nominations, a faculty committee votes to select the most worthy student. Graduate students are only eligible for the award once during their academic career at Berkeley.

The first student chosen to receive the prestigious Berkeley Trumpler Award, Statia Luszcz-Cook, was announced in January 2012. According to Department Chair, Imke de Pater, Luszcz-Cook is well deserving of the award as she is doing the equivalent of a "double thesis." Luszcz-Cook observed Neptune in the near-IR with the integral-field spectrograph OSIRIS on Keck (at these wavelengths, the planet is observed in reflected sunlight) and subsequently observed Neptune's thermal emission with CARMA at mm wavelengths, in particular the

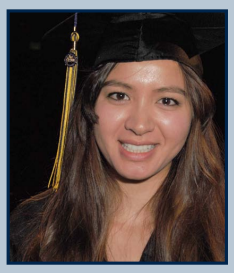
CO and HCN lines. She not only conducted the observations at these very different wavelengths, but also developed radiative transfer programs to analyze both sets of data. Luszcz-Cook hopes to graduate this coming summer.

Future award winners will be announced annually at commencement ceremonies in May.

2011 MARY ELIZABETH UHL PRIZE

Daniel Perley was selected to receive the 2011 Mary Elizabeth Uhl Prize at commencement ceremonies last May. This annual prize is awarded to a graduate student in Astronomy (or Physics, with a preference in Astronomy) for outstanding scholarly achievement. Perley's thesis project was based around a six year observing campaign using the Keck telescopes to study the properties of gamma-ray burst host galaxies and their connection with dust-obscured star formation in the early Universe. After completing his Ph.D. at Berkeley, Perley moved to Caltech to begin postdoctoral work as a Hubble Fellow.

2010 DOROTHEA KLUMPKE AWARD WINNER



In May 2011, Marin Anderson was chosen to receive the Dorothea Klumpke Award for outstanding scholarly achievement by an upper-level undergraduate student. She received this honor to recognize her research in the electrostatic discharge on Mars. Marin explains, "The Allen Telescope Array (ATA) at the Hat Creek Observatory in California was used to monitor Mars over a period of approximately 3 months for radio emissions indicative of lightning discharge caused by Martian dust storms." The results of this research were published in *The Astrophysical Journal* ("The Allen Telescope Array Search for Electrostatic Discharges on Mars", ApJ, 744, 15,). Anderson worked on this project under the supervision of Astronomy professor Geoff Bower and Department Chair Imke de Pater, and alongside SETI Chief Scientist Dan Werthimer, and Graduate student Andrew Siemion. According to Bower, "Marin performed a very thorough analysis of a complex data set using a sophisticated array of analytical tools and then wrote a clear and engaging article presenting the results. This is one of the most impressive undergraduate research projects I have seen."

More recently, Marin teamed up again with Bower to search for slow transients with archival 'Very Large Array' (VLA) data. Marin graduated in December 2011 with a double major in Astrophysics and Physics. She is continuing her research at Berkeley through the spring and summer of 2012 and hopes to attend graduate school in the fall.

ONE STEP CLOSER TO NEW CAMPBELL HALL

Campbell Hall, the home of Astronomy for the past 50 years, is one step closer to getting rebuilt. Demolition of the existing building is expected to begin in March 2012, with occupancy of New Campbell Hall slated for 2014. Recently secured state funding, combined with a federal grant and private donations, will finance much of the project.

Old Campbell Hall, shrink-wrapped, as it undergoes abatement.

The new building, like its predecessor, will have a basement, six stories, and a rooftop observatory. However, the similarities end there. New Campbell Hall will be equipped with state-of-the-art computing and research laboratories, as well as the requisite classrooms and offices. The rooftop observatory features optical and radio telescopes, both used for teaching. The building will also feature lounges, conference rooms and other common spaces designed to increase communication and collegiality. New remote observing facilities will be provided, allowing astronomers to connect with the Keck Telescopes on Mauna Kea in Hawaii, Lick Observatory atop Mt. Hamilton, and CARMA radio telescopes at Hat Creek. The Radio Astronomy Laboratory will house an updated machine shop and millimeter, digital, and electronic labs. The basement will house The Center for Integrated and Precision Quantum Measurement, a high stability, low noise research facility funded by the National Institute of Standards and Technology (NIST).

Rendering of New Campbell Hall

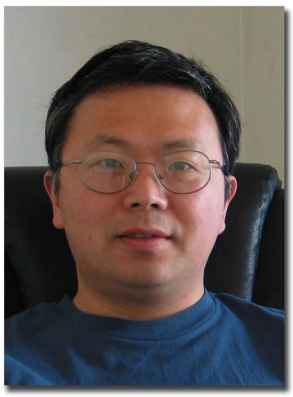
The highlight of the new design will be a suspended pedestrian bridge, connecting the Astronomy Department in New Campbell Hall with its neighbor, the Physics Department, located next door in Le Conte Hall.

IN MEMORIAM

WEIDONG LI

We mourn the unexpected death of our dear friend and close colleague Associate Research Astronomer Weidong Li, on 12 December 2011. For more than 14 years he was a key member of Professor Alex Filippenko's research group; in particular, he was in charge of running the Lick Observatory Supernova Search (LOSS) with the Katzman Automatic Imaging Telescope (KAIT). He also played a large role (and in many cases the leading role) in mentoring many dozens of undergraduate students who checked the KAIT supernova candidates each day, as well as some graduate students and postdoctoral researchers in Filippenko's group. He really loved the people in the Department and had a truly wonderful time here, and he was greatly liked and admired by those who knew him.

Weidong arrived at UC Berkeley in September 1997, and the following year LOSS really got going. It became, for about a decade, the world's most successful nearby supernova search, responsible for about 40% of those found each year. In total, it discovered almost 900 supernovae, many of which were quite young and thus scientifically most valuable. All of this was due to Weidong's incredible dedication, knowledge, ability, and enthusiasm. He was driven and passionate about his work. Whenever there were problems with KAIT, he would go to Lick Observatory and try to fix them, sometimes spending several days on the mountain with little sleep. If a really time-critical and exciting event came up, like a gamma-ray burst, he would stay up late at home, making sure KAIT conducted a thorough set of follow-up observations of the optical afterglow.



Weidong was a great astronomer and a wonderful friend. He was also a very warm, generous, cheerful person who wanted to enrich the lives of others and make them happy. He had an amazing spirit, and was tremendously excited about astronomy. We will miss him dearly.

DONALD C. BACKER

More than a year has passed since the Astronomy Department lost our dear colleague and friend, Don Backer. He passed away suddenly on 25 July 2010 at the age of 66.

Don's legacy to the department was substantial. He joined the Berkeley Astronomy Department in 1975 and became a Full Professor in 1989. He served as Department chair from 1998-1999, and again from 2002-2008. He was then appointed as the Director of the Radio Astronomy Laboratory, a position he held until his death. Throughout his career, Don was deeply committed to developing young scientists and many of Don's former students have become world-renowned astronomy leaders in their own right.

An innovative and visionary scientist, instrumentalist, and observer, Don was involved in numerous groundbreaking projects over his 40-year career. His research focused on pulsars, high-energy astrophysics, and the epoch of reionization, which he explored by developing imaginative, state-of-the-art instrumentation. Of particular note was his discovery of the first millisecond pulsar. The discovery of this fast pulsar, with a relatively weak magnetic field, revealed a unique new class of objects and revitalized pulsar research. Don was also a pioneer in Very Long Baseline Interferometry (VLBI), a technique that links together, via magnetic tape, distant radio telescopes to produce high-resolution images, allowing the investigation of astronomical structures with microarcsecond angular resolution. More recently, Don initiated a unique "telescope" that consists of an array of antennas spread over pastureland to detect intergalactic hydrogen that is affected by the first stars and galaxies that formed in the universe. This "Precision Array To Probe the Epoch of Reionization" (PAPER) led to two prototype deployments, one in Green Bank, West Virginia, and one in South Africa.

To honor Don and to insure we are able to continue the science he pursued with relentless energy and passion, the department has established the "Donald C. Backer Memorial Student Support Endowed Fund." This fund was created to provide support for graduate and undergraduate students in the Department of Astronomy, with preference given to those students with an interest in instrumentation, as this was one of Don's deepest passions. If you would like to donate to this fund, you may donate online at http://givetocal.berkeley.edu/browse/?u=7 or send a check made payable to "UC Berkeley Foundation" to Barbara Hoversten, Astronomy, B-20 Hearst Field Annex, MC3411, University of California, Berkeley, CA 94720-3411. Through the Chancellor's Challenge program, all donations made by current and retired faculty and staff through December 31, 2012, as well as donations from current students, will be matched dollar for dollar.

University of California, Berkeley
Department of Astronomy
Hearst Field Annex MC 3411
Berkeley, CA 94720-3411

Upcoming Events:

Science@Cal Monthly Lectures
The 3rd Saturday of each month
11:00 a.m., 100 Genetics and Plant Biology Bldg.
UC Berkeley
http://scienceatcal.berkeley.edu/lectures

CalDay 2012
April 21, 2012
9:00 a.m. – 4:00 p.m.
http://calday.berkeley.edu/

Raymond & Beverly Sackler Distinguished Lecture in Astronomy
Fall 2012
Speaker: **Adam Riess**
2011 Nobel Prize Winner
Johns Hopkins University
Date, Time and Location – To Be Announced
See the astronomy website for details:
http://astro.berkeley.edu

Astronomy T-Shirts

In 2011, the Department sponsored its very first Berkeley Astronomy T-shirt Design contest, which we hope marks the beginning of an annual tradition! Department members submitted designs for consideration, and everyone voted for their favorite. The winning entry was submitted by graduate student Adam Morgan. The shirts were an instant hit; they were popular not only with department members, but also with prospective students and amateur astronomers in the wider campus and Berkeley community. We even received an inquiry about purchasing one from an astronomer in Italy!

In addition, a T-shirt was also designed to commemorate our move to Hearst Field Annex (HFA) this year. Both T-shirts are now available for purchase at a cost of $12 each. Please contact Barb Hoversten at bhovers@astro.berkeley.edu to order.

The 2012 T-shirt Design contest launched in early February. Current students, researchers, faculty, and staff submited artwork for consideration. The new winning design will be available for purchase by CalDay in April. Stay tuned for further details!

Astronomy News . 2012
University of California, Berkeley

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Banner photographs, L-R: 1. Sather Gate, University of California, Berkeley 2. Keck Telescopes, Laser Guide Star, (Photo credit: Laurie Hatch) 3. Graduate student Ryan Foley and Professor Alex Filippenko in Keck II Control Room, (Photo credit Laurie Hatch), 4. Katzman Automatic Imaging Telescope (KAIT), Lick Observatory, (Photo credit: Laurie Hatch) 5. The full moon above one of the CARMA antennaes. (Photo credit: Steve Croft).

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