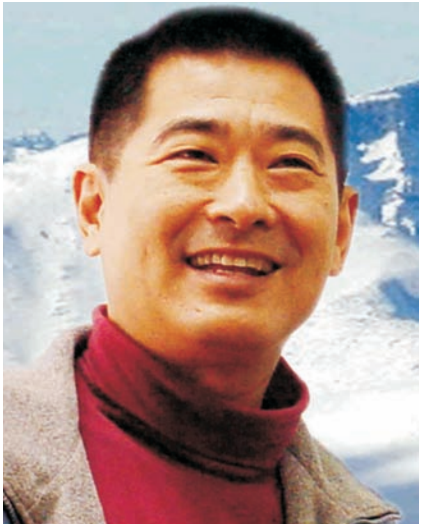

Darwin Chang

Investigator award from the US Department of Energy. He soon started a lifelong collaboration with one of us (Keung) in which we produced nearly 50 publications.

In 1993 Darwin became a professor of physics at National Tsing-Hua University in Hsinchu, Taiwan. He continued to expand his research interests, which eventually encompassed hyperon weak decay, top-quark spin and *CP* violation, sand piles, black holes, and even *d*-wave superconductivity. In one notable work with Keung and Apostolos Pilaftsis, he found new two-loop contributions to electric dipole moments, a result that provided one of the most stringent constraints on supersymmetric models.

Darwin was a strong force behind the promotion of fundamental science research in Taiwan. He served as president of the Physical Society of the Republic of China and was instrumental in the establishment of the National Center for Theoretical Sciences in 1997. He set up successful exchange programs between NCTS and other high-energy physics labs, including KEK in Japan, and served as the director of the NCTS physics division in 2004.

Open, honest, and down to earth, Darwin could also be critical in discussions. He always managed a cheerful smile and had a hallmark laugh. His energy and passion for physics was reflected in his skiing style: Regardless of obstacles, charge! Everything under the sun was physics for him; the only question he asked was, Is it interesting? Curiosity was a key word in his life, and adventure took the highest priority. He loved teaching and took great care of his students. Even during his final months, he tried hard to spend time with them. His presence and insightful comments were always stimulating at seminars. A week before his death, one of us heard him say as he lay in the hospital, "Oh, if I could just go to a seminar. . . ."

Darwin's interests extended to music, sports (swimming and skiing), and poetry. It is fitting to close with a few of his verses:

All my life,
I've been trying to find,
after every beautiful soul
  I encountered,
after every unfulfilling dream
  I blundered,
a joyful peace in my human
  weakness,
to accompany me to my
  willing decease.

His decease may not have been willing, but he has now attained eternal peace.

Hai-Yang Cheng
Academia Sinica
Taipei, Taiwan
George W. S. Hou
National Taiwan University
Taipei
Wai-Yee Keung
University of Illinois at Chicago
Lincoln Wolfenstein
Carnegie Mellon University
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Vladimir Konstantinovich Chernyshev

Vladimir Konstantinovich Chernyshev, an understudy to Andrei Sakharov and a leader in magnetic flux compression technology, died of cancer in Moscow on 30 April 2005. Vlad's health had noticeably declined since the passing of his beloved wife, Nina, in September 2003. At the time of his death, Vlad was a deputy scientific leader of the All-Russian Scientific Research Institute of Experimental Physics (VNIIEF) in Sarov—"the Russian Los Alamos"—where the Soviet Union's first nuclear weapons were developed.

Vlad was born on 5 June 1927 in the town of Serpukhov in the Moscow region of the Soviet Union. When he graduated from the Moscow Engineering Physics Institute in 1949, the Soviet government was recruiting the brightest young people into its nuclear weapons program. At VNIIEF, Vlad became involved in the physics of high explosives. He quickly distinguished himself and was awarded the Stalin Prize in 1953. His work with explosives led to the creation of safe detonators, which was the most important improvement for nuclear weapons safety. In 1962 he was awarded the Lenin Prize, and in 1970 he received candidate's and doctor's degrees in physics and mathematics.

In the early 1950s, Vlad became enthralled with Sakharov's ideas on magnetic cumulation—the concentration of magnetic energy through explosive-driven magnetic flux compression—and its application to controlled thermonuclear fusion. The achievement of fusion breakeven was a major goal for the remainder of Vlad's career, and he set out to develop the requisite technology.

Vlad's crowning achievements were magnetic flux compression generators that have reached performance levels unmatched by any other pulsed-power system in the world. In 1961 he invented the disk electromagnetic generator, a device that has generated up to 300 MA and 200 MJ in a 12-microsecond pulse. In 1998, he was awarded the Russian Government Prize for the development and scientific applications of the DEMG. Vlad's team developed the Potok series of helical generators and various types of opening switches that shorten a generator's output; with them the team achieved 90-MA pulses in 1 microsecond. At the time of his death, Vlad strongly believed that modern DEMG technology and MAGO (*magnitnoye obzhatiye*, or magnetic compression) plasma-formation systems, which he developed in partnership with one of us (Mokhov), had now made it possible to achieve the scientific breakeven point for fusion without the large initial capital investment that is required by the two more conventional approaches, magnetic confinement fusion and inertial confinement fusion.

Vladimir Konstantinovich Chernyshev

Many of Vlad's technical accomplishments are documented in the proceedings of the 10 international conferences on megagauss magnetic field generation and related topics. Although Vlad's name was on several abstracts submitted to the Megagauss I conference in Frascati, Italy, in 1965, and Sakharov, who coauthored several of the abstracts, encouraged Vlad to go, the Soviet Union's security regulations prevented him from attending.

Two of us (Reinovsky and Lindemuth) first met Vlad at the Megagauss V conference in Novosibirsk, Russia, in 1989. Fascinated by the accomplishments reported by his team, we queried Vlad at length. As a parting comment, Vlad offered, prophetically, "Maybe one day we can do an experiment in which you design the load and we provide the generator," something we knew made scientific sense but that, at the time, seemed only an impossible dream.

Just two and a half years later, the Soviet Union dissolved, causing worldwide concern about the fate of Russia, particularly the Russian nuclear weapons complex and the possibility of "brain drain." In January 1992, two of us (Reinovsky and Lindemuth) discussed the situation with Vlad as we walked down the streets of Moscow. Vlad replied, "If necessary, we [the nuclear weapons scientists] will all go back to our villages and farm," indicating the patriotism he shared with his colleagues. Proud of his homeland, he pointed to people standing in line at a museum and commented, "See, even in these troubled times, the spirit of our people is strong."

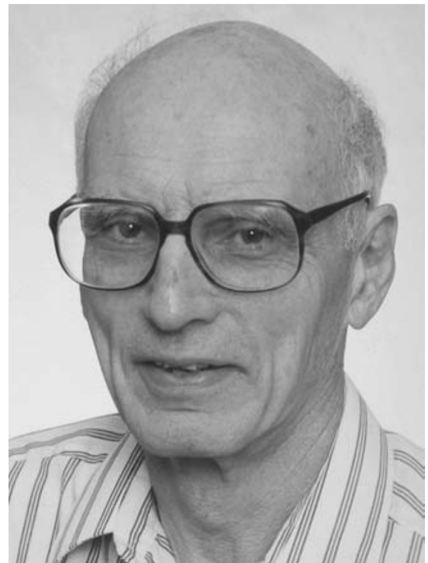
Vlad's legacy includes a now well-known scientific collaboration between VNIIEF and Los Alamos National Laboratory that started in 1992 and has led to more than 300 publications and presentations at major international conferences. Vlad believed strongly that the US and Russia must work together to make the world a safer place. During one of his last visits to the US, Vlad participated in a snowball fight with the teenage son of one of us (Reinovsky). Afterward, Vlad described the "strategic exchange of snowballs" (as opposed to nuclear weapons) as "the best possible outcome of a career of work."

In 2003, the Institute of Electrical and Electronics Engineers presented Vlad with the Erwin Marx Award to commemorate a truly illustrious career. Unfortunately, although Vlad had visited the US many times previously, the US government did not issue a visa in time for him to travel to the US to receive his award, a terrible disappointment to a scientist who had overcome many obstacles to make US–Russia collaboration a reality. The award was presented to Vlad eight months later in Sarov.

Vlad was a devoted husband, father, and grandfather, and he was understandably proud that one of the young scientists following in his footsteps is his grandson, Tony. Russia and the world have lost a brilliant man whose work will be studied for generations to come.

Irvin R. Lindemuth
Tucson, Arizona
Vladislav N. Mokhov
All-Russian Scientific Research Institute of Experimental Physics
Sarov
Robert E. Reinovsky
Los Alamos National Laboratory
Los Alamos, New Mexico

Edward Forbes Greene



Edward Forbes Greene

Edward Forbes Greene, a noted experimental chemical physicist at Brown University, died of pneumonia on 13 August 2005.

Born on 29 December 1922 in New York City, Ned, as he was called by his colleagues and friends, was raised in Beijing, where he was educated at the Peking American School. His father, Roger Sherman Greene, was the resident director of the China Medical Board and acting director of the newly formed Peking Union Medical College, both early projects of the Rockefeller Foundation.

A brilliant student, Ned entered Harvard University and in 1943, after only three years, graduated with an AB in chemistry and membership in Phi Beta Kappa. Between 1944 and 1946 he served as an electronics technician in the US Navy. His PhD research at Harvard, under the direction of George B. Kistiakowsky, was devoted to the mechanisms by which shock waves initiate detonations in cylindrical pipes. In 1949, after completing his PhD and making a brief visit to Los Alamos Laboratory, he joined the Brown University chemistry department, where he stayed for the rest of his life. Ned served as department chair in 1980–83 and was named the Henry D. and Louise Sharpe Metcalf Professor in 1985.

At Brown, Ned developed the use of shock waves to investigate chemical reactions. He and Norman Davison were the first to demonstrate the unique opportunities provided by shock waves, which heat a gas in nanoseconds to temperatures of several thousand degrees and thereby initiate high-temperature reactions that can be easily followed by observing the time-dependent light emission after the shock front passes. Research into shock-initiated chemistry has greatly expanded since Ned conducted his work in the 1950s, and it continues to be actively pursued in many laboratories worldwide. Ned's book with one of us (Toennies), *Chemical Reactions in Shock Waves*, first published in German (Steinkopff, 1959) and later in expanded form in English (Arnold, 1964), was the first authoritative monograph in that emerging research area and remains a standard reference in the field.

Ned had an extraordinary ability to identify important scientific questions and to develop strategies to address them. In 1955 he immediately realized the great potential of crossed-molecular-beam scattering experiments, demonstrated earlier that year by Ellison Taylor and Sheldon Datz at Oak Ridge National Laboratory. At Brown, with the use of a newly designed apparatus, Ned and his coworkers discovered the distinct maxima, now known as rainbows, in atom–atom angular distributions. In a 1962 crossed-beam study of the K + HBr reaction, Ned, Dieter Beck, and John Ross were the first to use a velocity-selected beam to measure the reaction threshold of a chemical reaction. Subsequently, they also developed a new method to extract reaction probabilities from reactant angular distributions.

In the late 1970s Ned became interested in surface science and its abundance of unsolved problems. Using elastic and inelastic scattering of atomic beams from single-crystal surfaces, he