Louis Albright ’63, M.S. ’65, Ph.D. ’72, a world-renowned expert in environmental engineering of agricultural buildings and a pioneer in renewable energy systems, died March 26, 2022 in Ithaca. He was 81.

After earning his degrees at Cornell and spending two years teaching at the University of California, Davis, Albright returned to join the Cornell faculty in 1974. He taught at Cornell until 2010, when he was elected professor emeritus of biological and environmental engineering.

Born December 31, 1940, Albright grew up in Newfield, New York, the child of two Cornell alumni. He served in the U.S. Army from 1965 to 1968.

His research career began with predicting air flow patterns in buildings and quantifying the behavior of wall jets, which are used to improve ventilation in livestock housing such as dairy barns. Proper ventilation is critical for the health and well-being of livestock, reducing disease incidence and overheating. Albright then
moved to understanding and improving environmental control in greenhouses – the work for which he is perhaps best known.

During the energy crisis of the 1970s, Albright became interested in understanding how the Northeast could grow more of its own vegetables to avoid relying so heavily on imported produce. In collaboration with the New York State Energy Research and Development Authority, Albright built research greenhouses in Ithaca and used them to develop and test procedures and strategies to grow organic vegetables like lettuce, kale, and spinach in a way that was fast, productive and environmentally friendly.

For many years afterward, the greenhouses were used to grow vegetables for commercial sale by several ventures, including Challenge Industries. The procedures Albright developed have been adopted by growers across the Northeast to help them produce vegetables year-round in cold climates.

Francis Vanek, senior lecturer in Civil and Environmental Engineering, met Albright in 2004 when both were teaching courses on renewable energy. Albright first developed a course on renewable energy systems in the 1990s, and he was “way out ahead of his time” in doing so, said Vanek, who now teaches the course. “That’s not something we studied in graduate school at the time and could just adapt. He built that course from scratch,” Vanek said. “That was a big contribution to create such a long-running course on renewable energy, which is now becoming more and more important and many students want to study it.”

In addition to more than 100 peer-reviewed articles and book chapters, Albright wrote two books that have become indispensable in the field of biological and environmental engineering: “Environmental Control for Animals and Plants” and a textbook, “Energy Systems Engineering,” which was co-written by Vanek. First published in 2008, the textbook is now in its fourth edition, and it has been translated into Chinese, Korean, and Swedish.
Albright also owned or co-owned three commercial patents on controlling light and carbon dioxide in greenhouses to optimize plant growth. He was named a fellow of the American Society of Agricultural Engineers in 1994.

Albright was also widely recognized as a superb teacher and mentor. In 2004, his students nominated him for the Stephen H. Weiss Presidential Fellowship, which honors faculty members who have shown sustained commitment to undergraduate teaching and advising.

Chris Hogan ’04, who nominated Albright, recalled Albright urging him to engage in undergraduate research and giving him tips on approaching faculty members about working in their labs. The encouragement helped Hogan publish two peer-reviewed articles by the time he graduated, he said.

“Every year, he took the time to learn the names of all the 100-plus students in his introductory BEE 151 class,” said Hogan, now a professor of mechanical engineering at the University of Minnesota. “It is very difficult to find a professor so dedicated and so caring toward teaching undergraduates as Dr. Albright was.”

Hogan said Albright was “incredibly influential in advancing my knowledge and shaping my career goals.”

In a recorded interview, Albright described his teaching philosophy simply: “Treat your students like your children.”

He is survived by his wife, Marilyn, son Adam ’96, daughter Amy, and step-daughters Darla and Rhonda.

Written by Krisy Gashler
Dr. Muawia Barazangi, Professor Emeritus of Earth and Atmospheric Sciences at Cornell University, died on March 30, 2022. Muawia was born to Badeah Sukkar and Muhamed Nor Al-Deen Barazangi on September 14, 1941. He grew up in the city of Damascus, Syria, and graduated in 1965 from the University of Damascus with a bachelor’s degree in Physics and Earth Sciences, with distinction. Subsequently he received a scholarship from the University of Minnesota to earn a master’s degree in Applied Geophysics in 1967 working with Professor Harold Mooney. Following graduation, he received a scholarship from Columbia University’s Lamont Geological Observatory in Palisades, New York and earned a doctorate in Seismology in 1971. In 1972 he was hired by Cornell, where he spent the rest of his career as a Postdoctoral Scholar, Research Associate, Senior Research Associate, Senior Scientist, and Professor, except for a stint from 1979-1980 as Chairman of the Department of Geophysics at King Abdulaziz University, Jeddah, Saudi Arabia.

As an observational seismologist, Muawia participated in and led numerous landmark studies. With Jim Dorman, Muawia created the
first digital global seismicity map in 1968 that was used in the classic “Seismology and the New Global Tectonics” paper by Isacks, Oliver, and Sykes (1968) and was published in the Bulletin of the Seismological Society of America (1969). Muawia worked with others in pioneering deployments of portable seismometers near Cape Mendocino, California (1968), in the Intermountain Seismic Belt (Idaho, Utah, Wyoming, Montana) and the southwest Pacific in 1971 and 1977 (Tonga, Fiji, and Vanuatu). In later years, he was involved in seismological as well as paleoseismic and geodetic field work in Morocco, Syria, Saudi Arabia, Lebanon, and Turkey.

Muawia worked with many scientists during his Ph.D. at Columbia. His thesis was made up of three papers: two papers about the southwest Pacific with Bryan Isacks and Jack Oliver, where Muawia showed that extreme variations in seismic wave attenuation and velocities in the upper mantle near inclined zones of earthquakes were related to subduction and back-arc basins, as well as a paper with Chris Scholz and Marc Sbar on the late Cenozoic evolution of the Great Basin, Western United States.

The seismotectonics of subduction and continental collision was a major theme through many of Muawia’s papers, particularly after arriving at Cornell. Particularly influential works include documentation of the segmentation of subduction in South America and the existence of active regions of flat slab subduction (Barazangi and Isacks, 1976), the underthrusting of Indian plate beneath the Himalaya (Ni and Barazangi, 1984), evidence for lithospheric delamination in the western Mediterranean (Seber et al., 1996; Calvert et al., 2000), and the Zagros continental collision zone (Snyder and Barazangi, 1986). Other key thrusts were deep seismic reflection of the continental crust and active tectonics and earthquake hazards, especially around the Dead Sea Fault (Ambraseys and Barazangi, 1989; Meghraoui et al., 2003).

Muawia has a legacy as a scientific diplomat whose work spans disciplines and nations. As a representative for the United Nations Educational, Scientific, and Cultural Organization (UNESCO) he
participated in the Programme for the Assessment and Mitigation of Earthquake Risk in the Arab Region and for this project he traveled extensively through the region (1982-1987). He made many visits to Syria to advise about earthquake hazards and seismology through the United Nations Development Programme and the United Nationals Transfer of Knowledge Through Expatriate Nationals project. Over decades, he has planned, coordinated, and participated in numerous international scientific workshops in Morocco, Turkey, Syria, Lebanon, Saudi Arabia, Egypt, and Algeria and was a member of the Committee for Developing Countries of the International Association of Seismology and Physics of the Earth’s Interior (1991-1997). Starting in the early 1990’s, Muawia was a pioneer in digitizing diverse geological and geophysical records and making them available through Geographical Information Systems and the world wide web, with support from the Comprehensive Nuclear Test Ban Treaty Organization and others.

Several Cornell alums called Muawia "the soul of the department" - a fitting title for a colleague who showed that he cared in so many ways. Muawia was instrumental in training innumerable graduate students, research staff, and scientists, mentoring them even if he wasn’t their supervisor. For the 11 years after he retired, and before the pandemic, he would routinely check in with students to ask them about their research and future plans, share a scientific paper he had just seen, or just to offer them fruit and candy. On multiple occasions he helped these students find jobs or summer internships. Muawia could always be counted on to come to student seminars and ask thoughtful questions and work with students to improve their presentations. He had an infectious sense of humor that often involved him saying that "You can yet be turned into a seismologist" or offering them a grade of a “C-” if they needed to improve some aspect. He was loved and respected across the world, wherever his research brought him. He will be missed.

A video interview of Muawia describing his career is available at: https://www.youtube.com/watch?v=f7F8__RJeGs
His publications are available at: https://ecommons.cornell.edu/handle/1813/28943
His papers and maps are part of the Rare and Manuscript Collections of the Cornell University Library and Map Collection:
https://rmc.library.cornell.edu/EAD/htmdocs/RMA04328.html
https://exhibits.library.cornell.edu/barazangi-map-collection

Written by Matt Pritchard, Geoff Abers, and Larry Brown
Dr. Donald (Don) Wilbur Barton, professor emeritus of horticulture, passed away on October 7, 2021 in Canandaigua, New York at 100 years.

Don was born June 12, 1921, in Fresno, California. He earned a B.S. in plant science in 1947 and Ph.D. in genetics in 1949, both from the University of California at Berkeley. His education was postponed due to World War II as he served in the U.S. Air Force from 1943-46. Tragically, on Don’s 20th mission his plane was shot down by German fighter aircraft and he was captured and held prisoner of war for almost one year. He received the Air Medal, Purple Heart Medal, and the Prisoner of War Medal; Don was Honorably Discharged from service with the rank of First Lieutenant in 1946.

Don came to Cornell in 1951 as an associate professor in the Department of Vegetable Crops at the New York State Agricultural Experiment Station (NYSAES) in Geneva (currently known as Cornell AgriTech). His research focused on breeding disease-resistant pea and sweet corn varieties until 1959. In 1960, he became the ninth director of NYSAES, a role in which he served until his
retirement in 1983. Don had a significant impact on the growth of the Geneva campus and oversaw numerous capital projects during his tenure, including the construction of four new campus buildings and one which Cornell University and the Board of Trustees voted to name Barton Laboratory in Don’s honor.

Don oversaw the purchase of four properties that continue to be critical to the Experiment Station’s research: The Fruit and Vegetable Research Farm, Lucey Farm, the Hudson Valley Research Laboratory, and Wellington Farm. He advocated for efforts to conserve fruit, nut and vegetable germplasm and co-authored an impactful paper on the importance of national repositories of valuable crops. This led to the creation of the United States Department of Agriculture’s germplasm repository on the Experiment Station campus, and at multiple locations across the country. The USDA-Agricultural Research Service has grown in mission and size to become a major contributor to mission-oriented science on the Cornell AgriTech campus today.

He also expanded the research farms and strengthened relationships with growers, industry leaders, and state officials. He prioritized establishing strong relationships with vegetable growers, food processors, and state officials responsible for funding that could benefit Experiment Station research, which would in turn bring benefits to its stakeholders. He led the expansion of research into grape and wine, supporting development of new varieties and encouraged the passage of New York’s 1976 Farm Winery Legislation, which helped the state’s emerging wine industry to flourish.

Don was tuned-in and supportive of the concerns and needs of all NYSAES employees. He and his wife Ginny promoted a family atmosphere at the station and participated in all social events. The holiday parties they initially held at their residence were appreciated by all. Don’s supportive style was exemplified by his efforts to lobby CALS leadership to match funds raised by employees to build the baseball field, adjoining pavilion, and picnic tables enjoyed by many in the area behind Jordan Hall. Following Don’s retirement,
he served as an agricultural research consultant in 17 countries, including the Philippines, Indonesia, Afghanistan, India, Ghana, and Bangladesh. In 2019, Don was inducted into the New York State Senate Veterans Hall of Fame for the 54th Senate District.

Don served on numerous local, national, and international task forces, boards and committees in the interest of science as related to Cornell University and agriculture around the world. He was a member of the American Society for Horticultural Science, Genetics Society of America, International Society for Horticultural Science, and Sigma XI. He received recognition and awards for his significant contributions, including being named Fellow of the American Society for Horticultural Science in 1973.

Don was predeceased by his wife, Ginny (Virginia Winston Barton), in 2007 after 63 years of marriage; and by his sister, Geraldine in 2011. He is survived by his four children Paul and wife Amy Hagberg of Limerick, Maine, Ken and wife Michelle of Wildwood, Missouri, Donna and husband Denis O'Leary of South Bend, Indiana, and Alan of Watkins Glen, New York. He also leaves four grandchildren; and four great-grandchildren; along with two nieces, a nephew, cousins, second cousins, and many more distant relatives. Don enjoyed the last 13 years of his life with his companion, Adrienne O’Brien of Canandaigua, New York.

Written by Jana VanHouten, Bruce I. Reisch, Alan Taylor, George Abawi, and Mary-Lou Dumbleton
Dr. Steven V. Beer, Professor Emeritus of Plant Pathology and Plant Microbe Biology, died on January 12, 2022, at 80. He is missed by his family and his many colleagues, advisees, and friends across the globe.

Beer graduated from Cornell with a Bachelor’s in Biochemistry in 1965, then earned a doctoral degree in Plant Pathology at U.C. Davis before joining the Cornell faculty in 1969. During his more than 50 years in CALS, Beer (“like the beverage”) directed a pioneering research program that improved our understanding of the molecular basis for plant diseases caused by bacterial pathogens, and of plant immunity. His focus was on fire blight of apple and pear, which damages orchards around the world, and for which control measures are limited. In later years, Beer turned his attention also to sour rot of onion, another difficult to control disease important to growers in New York and elsewhere. Much of his work explored new approaches to disease control based on fundamental discoveries made in his lab and through his many collaborations.

The greatest example is harpins, a set of proteins produced by
bacterial pathogens in the early stages of attack. Discovered and first characterized in Beer’s lab by then postdoctoral associate Zhongmin Wei, in collaboration with the research group of fellow Cornell Plant Pathology Professor Alan Collmer, harpins are extracellular components of a bacterial apparatus that injects virulence factors into plant cells. The discovery of the first harpin, and the groundbreaking finding that harpins can trigger an immune response in some plants, spurred progress in both fundamental and applied plant science. Harpins became an important tool to dissect the genetic and biochemical components of plant immunity, and Beer and colleagues commercialized several products based on harpin technology for environmentally friendly crop disease production and yield enhancement. One of these products earned the team a Presidential Green Chemistry Challenge award from the Environmental Protection Agency.

Other examples include genetic modification of apple trees for resistance to fire blight, carried out with Herb Aldwinckle’s group at the then New York Agricultural Experiment Station in Geneva, New York (now Cornell AgriTech), and biocontrol using bacterial competitors of the fire blight pathogen that do not cause the disease, work that benefitted from long-time collaborations with then Ithaca College Professor Rich Wodzinski and New Zealand Institute for Plant & Food Research scientist Joel Vanneste.

In addition to his many research accomplishments, Beer advanced the CALS and Cornell mission through dedicated service, teaching, and advising. Notable service examples include memberships on the CALS Academic Integrity Board and the University Faculty Committee on Academic Freedom and Responsibility, and multiple terms as Speaker of the Faculty Senate. Beer’s many teaching contributions included a long-running lecture and lab course in phytobacteriology (Plant Pathology 707), and one that merged two of his passions, “Microbes and Food: Contemporary Issues Affecting Humanity” (Plant Pathology 4161). In addition, during his time as Director of Graduate Studies in Plant Pathology, and through his leadership of a USDA National Needs Fellowship Program in Molecular Plant Pathology, Beer recruited many excellent graduate
students to his field. And, he personally advised dozens of undergraduate and graduate students, as well as postdocs and visiting scholars.

As one of his advisees (Ph.D. 1997), I will remember Steve Beer for his kindness and for challenging students to think for themselves. He advised in the best way - not by giving instructions, but by asking questions. There were two questions I remember him asking often, in his booming, barrel-chested baritone. The first, a kind but serious “Who cares?”, taught me to think about why my research matters, to do research that matters, and to articulate clearly why it matters. The second, a sincere and cheery “How’s Adam?”, expected a no-less considered answer. And if the answer was that you needed something - help with an experiment, a professional connection, who to call to get your washing machine fixed - Steve saw that you got it. Among his many contributions, Beer’s support of new generations of plant pathologists is indeed perhaps his most enduring.

Beer is survived by his wife of 58 years, Beverly; his three children, David Beer ’89, Rachel Beer, and Jennifer Beer Fiorino ’90; and five grandchildren.

Written by Adam Bogdanove
Toby Berger, the Irwin and Joan Jacobs Professor of Engineering Emeritus, died May 25, 2022 at his home in Charlottesville, Virginia. He was 81.

During his almost forty years with the School of Electrical and Computer Engineering, Toby made manifold contributions to the field of information theory both in research and in service to the community. The School’s widely recognized strength in information theory is due in no small part to Toby’s long presence on its faculty.

Unlike many of his contemporaries in the field, Toby did not start his career as an information theorist. Born September 4, 1940 in New York City, he received his Bachelor’s degree in electrical engineering from Yale and his Ph.D. degree in applied mathematics from Harvard, writing his dissertation on Nyquist sampling. While studying at Harvard, he worked at Raytheon as a senior scientist, and continued there until 1968, when he began his academic career by moving to Cornell’s School of Electrical Engineering, as it was then called, and into information theory.
Toby’s work over the next half-century was notable for its depth, expansiveness, and vision. Most of the important results on distributed lossy compression were obtained by Toby and his students starting in the 1970s and continuing to the early-1990s. Starting in the late 1990s, intrigued by the remarkable energy efficiency of the human brain, Toby turned his attention to the intersection of information theory and neuroscience. Although hardly the first researcher to explore the relevance of these fields to one another, Toby brought a seriousness of purpose, a willingness to question the foundational assumptions of information theory, and a technical sophistication that were unparalleled. In 2005, Toby retired from Cornell and moved to the University of Virginia, for family reasons and to collaborate with William “Chip” Levy, a neuroscientist there. He retired from the University of Virginia at the age of 79.

Toby served the information theory community in several capacities, most notably as Editor-in-Chief of *IEEE Transactions on Information Theory* from 1987 to 1989, and as president of the IEEE Information Theory Group in 1979. He hosted the community in 1977 when he brought the IEEE International Symposium on Information Theory to Ithaca. He received the Claude E. Shannon Award, the highest award in the field, in 2002, devoting his Shannon lecture to information theory and neuroscience. He also received the 2011 IEEE Richard W. Hamming Medal for outstanding achievement in information sciences, and in 2006 was elected a member of the U.S. National Academy of Engineering.

Toby was a noted expositor and teacher. His book, *Rate-Distortion Theory: A Mathematical Basis for Data Compression*, published in 1971, remains the definitive text on its subject even after fifty years. Toby was also the co-author of several survey papers that proved to be influential. Toby graduated a total of forty-three Ph.D. students, forty-one from Cornell and two from the University of Virginia. Many of these students have become prominent in the field in their own right, including Dick Blahut and Raymond Yeung, both themselves winners of the Shannon award and authors of well-known books on information theory. Students describe Toby’s
lectures in graduate information theory courses as life-changing and recall him arriving with nothing more than a bag of chalk. Toby received the IEEE Leon K. Kirchmayer Graduate Teaching Award in 2006.

The impact of Toby’s work also extended to industry. In the 1990s, he founded a company, Sightspeed, to commercialize research on video conferencing over phone lines. Toby thus anticipated by over two decades the need for video conferencing technology that became so acute in 2020. The company was later acquired by Logitech. He co-invented a method for multiple access that is used in Wi-Fi.

Toby gave freely of his time and advice, particularly to junior colleagues finding their way at Cornell, and over the years his eye for talented students and faculty recruits catalyzed the ascendance of Cornell as a leading center of information theory research. Toby was also an avid tennis player, a loyal fan of Cornell men’s basketball, and an amateur musician with a special talent for blues harmonica. Above all, family came first for Toby, whose wife Florence, daughter Elizabeth, and son Larry were his primary focus. The special pride he took in his accomplished children, who followed in his footsteps as Yale undergraduates, was always palpable. Toby is remembered for his warmth and generosity, along with his keen sense of humor and adeptness at human connection, which made him an exceptional colleague.

Written by Aaron B. Wagner and David F. Delchamps
Jack McDonald Blakely, Emeritus Professor of Materials Science and Engineering, died on October 29, 2021. He was 85 years old.

Jack was born in Dalry, Ayrshire, Scotland, on April 8, 1936, to Elizabeth McDonald and James Blakely and educated at Dalry High School and Glasgow University, where he received a Ph.D. in surface science in 1961. He emigrated to the U.S. with his bride, Nanette, in 1961 to take a two-year postdoctoral position at Harvard after which he was offered an assistant professorship at Cornell University. Jack began his career at Cornell in 1963 and he joined the recently created Department of Materials Science and Engineering that intended to integrate physics and chemistry with metallurgy.

In those early years at Cornell, Jack was one of a group of cross-campus and department faculty (Balluffi and Seidman come to mind) who focused on the diffusion of atomic species on single crystal surfaces, the study of the structure and geometry of atomic phase transitions of metallic surfaces, and the electronic properties of ionic surfaces. He and his students developed theoretical concepts...
and experimental techniques in the study of surfaces such as low energy electron diffraction (LEED) and surface probes such as the Kelvin probe to study the atomic and electronic nature of surfaces.

As Jack’s career progressed, he turned his focus on the structure and composition of surfaces and the influence of the geometry and electrical character of surfaces on their function in electronics, corrosion and friction. He was one of the first to describe the formation of graphene on metal surfaces, showing the reversible 2D phase transition of carbon and the need to describe the surface composition as a surface phase transition.

Jack was adept at incorporating new methods of fabrication and characterization to advance surface science and to bring new insight to problems that had interested him from the beginning of his research career. In particular, the Blakely Group applied the techniques of scanning probe microscopy, glancing-incidence X-ray diffraction, and low-energy electron microscopy to develop a detailed picture about the formation and motion of atomic steps on nanostructured single-crystalline silicon. As satisfying as it was for him to deepen his expertise, Jack’s natural curiosity led him into collaborations where his knowledge of surface science could impact areas ranging from structure of glass surfaces to the growth of organic semiconductors.

Perhaps because of the way he was educated in Scotland, Jack developed warm and friendly relationships with his students; he treated his students as peers, and in the early days, he arranged for get-togethers on Friday evenings in Collegetown, where all kinds of topics, especially outside of the field of science, frequently turned to vigorous discussions on national and international news items of that time.

Jack authored or co-authored four textbooks, the most notable being “Surface Physics of Materials: Materials Science and Technology” which discussed transport of matter on surfaces, chemical analysis, adhesion and friction.
Jack was a Fellow of the Science and Engineering Research Council, the American Physical Society, the Institute of Physics, and the National Science Foundation. He was also a Guggenheim fellow and received the Kelvin Prize in Experimental Physics in 1960.

He took a number of sabbaticals including to Cambridge University, Argonne National Laboratory, Sandia National Laboratory, University of California at Berkeley and York University, and he served two terms as Chair of Cornell’s Department of Materials Science and Engineering, beginning in 1988 and then in 1997. As department chair, Jack recognized the importance of the Department of Materials Science and Engineering taking leadership in advanced materials, advocating for faculty excellence in areas such as organic electronics, polymers, and biomaterials. Jack fostered an accepting and supportive atmosphere within the department, mirroring the way that Jack and Nanette had personally welcomed and nurtured students, postdocs and junior faculty throughout their Cornell years.

Documenting Jack’s technical accomplishments is only a part of who he was as a human being. He was a creative, witty, and curious individual with many interests. Jack could recite poetry from memory, ranging from Robert Burns to bawdy ballads. He was an exceptional athlete, a lover of music, nature, dogs and cats, and a loving husband, father and grandfather. He learned to play soccer as a young child, and proudly represented “the rest of Scotland” team in their match against Glasgow High School at the famous Ibrox Stadium in 1953. He dedicated much of his time to coaching regional club and youth soccer teams, including at Cornell. Jack was a middle- and long-distance runner – few could keep up with his 6min/mile training pace at Barton Hall – and ran the Boston Marathon, among others, a number of times. Jack reunited with the violin playing of his youth while in his 40s and later expanded his musical interests to include the piano and mandolin.

Jack is survived by his wife of 61 years, Nanette, two daughters, Robin and Karen, and six grandchildren. He will be missed by his colleagues, students, and his family.

Written by Dieter Ast, Steven Danyluk, and Christopher Umbach
Professor Emeritus Stanley Bowman was known to his colleagues and students as Stan in the Department of Art at Cornell University. He was well known for his brightly colored shirts and suspenders as well as the large oversized images that covered his studio office wall, from giant plywood cutouts to strikingly black and white Xerox images and computer-manipulated images. A true creative spirit he embraced a research practice in contemporary art moving from architecture, to photography, to digital photography, and later experimenting with the i-phone and its applications, video, animation, music and giclée printing.

Stan was born in Oakland California on April 27, 1934 in Oakland, California, the youngest son of Joseph Walter and Hazel (Almquist) Bowman. In 1957 he entered Berkley’s architecture program, graduating in 1964 with a Bachelor of Architecture degree. His early job in architecture gave way to a life-long passion in photography. He completed his Masters of Fine Arts from the University of Mexico in Albuquerque concentrating in photography. He was hired at Cornell in the Department of Art in the College of Architecture, Art, and Planning to develop the photography concentration.
Former student Laurie Snyder recalled, “Stan was a generous and caring teacher. He patiently explained the intricacies of the craft of photography, as well as introduced various concepts about image making. His classes were a pleasant mixture of encouragement and challenge. As the years went on, Stan hired me to teach various classes at Cornell and encouraged me to seek the MFA at Syracuse University. After more than 30 years of teaching, I realize that Stan informed my teaching style. He was a role model of the artist who creates and the teacher who shares his excitement and craft. He was always trying new techniques and ideas and shared his enthusiasm from his own research and practice. I am thankful that our paths crossed in many significant ways.”

In the mid-seventies the contemporary art world was moving through a radical shift in its obsessions with formalism to confronting the social issues of the time and photography was in the middle of that upheaval. Cornell MFA alumni Kathy Morris (1976) explained “Having spent the previous years away from academia, immersed in the burgeoning Feminist Art Movement, I was on fire with a new view of the world. I had a lot to say during Stan’s class, especially about depictions of women by male photographers. At some point, Stan came to me and said, in his quiet, thoughtful way, if I might present a slide presentation for the class. I spent weeks on research on women photographers and making slides of women’s imagery. Thanks to Stan’s open mind, that presentation expanded into many years of research, lectures, and nourishing connections with other women.”

Professor Bowman nurtured the department of photography from 1973 until he retired in 1999. Professor Bowman was the Chairperson of the Department of Art from 1980-1985, was Associate Dean of the College of Architecture, Art and Planning from 1992 to 1996 and Acting Dean for the College from 1996-1997.

Stanley Bowman is quoted as saying of photography, “Photography is picture making. It is about seeing, feeling, expressing…and it is magic! When it comes to my art I am an explorer.”
Photography was first for me in the 1950's as it opened ways of seeing and picture making that I had not experienced before. Then in the 1980’s as the result of a Cornell University grant I was able to get state of the art computer equipment and software and started exploring photography through this new technology.” Professor Bowman was seminal in the development and incorporation of art and technology into the art curriculum. A Cornell grant provided a research platform for him to develop courses in Computer Art from 1990 to 1998, directing an intern program in computer graphics with a NYC advertising firm. After his retirement, Stan continued to teach Introduction to Digital Imaging classes during the summer after his retirement with an emphasis on digital imaging as a tool and photography.

Professor Emeritus of Art Barry Perlus recalled "As digital technology evolved, Stan moved right along with it, finding ways to use new devices and their expanded capacities for artistic ends in both his work and his teaching. His engagement provided a model for me as a new assistant professor and showed me what was possible at Cornell. His trailblazing for the arts and technology helped me and other art faculty to adopt technology in the art studios."

Stan Bowman’s work is represented in several international and national collections including the University of New Mexico Museum of Art, Albuquerque, New Mexico, the Catskill Center of Photography, Catskill, New York, the San Francisco Museum of Modern Art, San Francisco, California, the Bibliotech Nationale de Paris, the Erie Art Museum, Erie, Pennsylvania, the Musees D'Aurillac, Aurillac, France, and the German Photographic Society, Cologne, Germany.

Stan Bowman had numerous exhibitions including the Herbert F. Johnson Museum of Art, Chicago Art Institute, University of New Mexico Art Museum, University of Rhode Island, Colgate University, the Memorial Art Gallery, OK Harris Gallery in NYC, Center for Photographic Studies in Holland, Gallerie Artoque in Lyon, France, Photogaleria 58 in the Netherlands, Photokin in Koln,
Germany, Royal Danish Academy in the Netherlands. His work, both text and images, was published in such periodicals as *The Village Voice, Innovative Printmaking*, and *Zoom* magazine.

Stan, with his wife Mary Ann Bowman, also an artist and ceramicist, participated actively in many local Ithaca galleries including the State-of-the-Art Gallery. Stan served for many years as President of the cooperative gallery. Both he and Mary Anne were very active participants of the Ithaca Art Trail for many years, opening up their studios to many Ithaca residents yearly.

Professor Stan Bowman is survived by his wife of sixty-two years, Mary Ann Bowman. They have two sons Eric and Greg and two grandsons, Benjamin and William. The entire Cornell Community extend their condolences to the entire family. Emeritus Professor Stan Bowman leaves behind him many students and colleagues who miss him.

*Written by Renate Ferro and Paul Ramirez Jonas*
Professor Emeritus James Bramble passed away on July 20, 2021, in Austin, Texas. He was 90 years old.

James (Jim) Bramble earned his bachelor's degree from Brown University in 1953. He earned his Ph.D. degree from the University of Maryland in 1958, where he was a student of Lawrence Payne. After working for General Electric and the Naval Ordnance Laboratory, he became a professor at the University of Maryland. He was recruited to Cornell in 1968 to join Professor Payne in creating a group in applied mathematics within the Mathematics Department and supporting the new Center for Applied Mathematics, which he later directed. In 1970, Jim co-founded the Finite Element Circus, a conference devoted to the theory and applications of the finite element method, and related areas of numerical analysis and partial differential equations; he joined the (virtual!) 50th anniversary of the conference in November 2020. From 1975 to 1983, he was chief editor for the journal, Mathematics of Computation. Jim served as Associate Chair and Director of Undergraduate studies from 1981 through 1984. He retired from Cornell in 1994 and took up a Distinguished Professorship at Texas
A&M University, where he retired as Distinguished Professor Emeritus in the early 21st century. He taught numerous undergraduate and graduate students, mentored 22 Ph.D. students, and had colleagues throughout the world.

Much of Jim's research focused on numerical methods for partial differential equations. His early work involved the mathematical analysis of finite difference methods for elliptic problems. His later work was more focused on the numerical analysis of finite element methods. His work on multigrid and domain decomposition methods exemplified applied mathematics that bridges rigorous theory and practical numerical computation. Perhaps his most famous result, the Bramble-Hilbert Lemma provides an essential inequality for proving error estimates for the finite element method. This was a collaborative effort with his Ph.D. student, Stephen Hilbert. In 1985, Jim received an honorary doctorate from Chalmers University in Sweden in recognition of his important contributions to mathematics. Jim was a generous and effective collaborator. He established groups of colleagues and students at each place he worked (Maryland, Cornell and Texas A&M) that expanded his work and influence in the field.

In 1978, Jim married Margaret (Peggy) Hays, now deceased. Evidently drawn to Austin for the possibility of year-round tennis, Jim and Peggy returned to their lakeside cottage Ithaca every summer. They enjoyed entertaining friends and family, playing golf and tennis, and boating. Jim is remembered with great affection for his ability to balance mathematics and his other passions, his infectious enthusiasm enhancing his mathematical collaborations.

James Henry Bramble was born on December 1, 1930 in Annapolis, Maryland to Edith and Clinton Bramble. He had two sisters, Mary Aller and Barbara Lawrence, both deceased. He is survived by his four children, Margot Dermody of Pittsburgh, Pennsylvania, Tamara Lamenzo of Needham, Massachusetts, Mitzi Bramble of Harwich, Massachusetts, and James Bramble of Austin, his step-son, Alan Hays of Ithaca, and eight grand-children. He also is survived by his first wife, Mary Eppie Boze. He will be remembered fondly by
family, friends, and colleagues worldwide.

Written by Tara Holm (chair), John Guckenheimer, Timothy Healey, and Alex Townsend
Leroy Creasy ’60, M.S. ’61, whose research on the health benefits of grapes and red wine has spurred decades of public interest and scientific inquiry, has died. A professor emeritus of pomology in what is now the Horticulture Section of the School of Integrative Plant Science in Cornell’s College of Agriculture and Life Sciences, Dr. Creasy died June 15, 2022 in Aurora, New York. He was 84.

Dr. Creasy’s most influential work focused on resveratrol, a natural compound found most abundantly in red and purple grapes. In the early 1990s, Creasy and his then-undergraduate student Evan Siemann identified resveratrol in red wine and posited that this heart-healthy, cancer-fighting compound might explain the “French paradox” – why Mediterranean populations that had relatively high smoking rates, high-fat diets and higher wine consumption also suffer fewer heart attacks and lived longer than populations with ostensibly healthier habits.

Resveratrol is a type of secondary metabolite – a compound created by a plant to ward off insects or fight disease. Over 70 species of plants produce resveratrol, including peanuts, cocoa beans and
blueberries, but it occurs in highest amounts in the skin of red and purple grapes. Grapes produce resveratrol in response to disease pressure, especially from mildew – a common plague of grape growers in New York – and Dr. Creasy found that New York-grown grapes were higher in this beneficial compound than grapes grown in sunnier climates. Later research showed that resveratrol production can also be triggered by UV radiation.

Dr. Creasy’s discoveries drew tremendous public attention, including features on “60 Minutes” and in The New York Times. They also drew controversy, as some public health officials and other researchers warned against the negative effects of increased alcohol consumption.

Dr. Creasy was a member and past president of the Phytochemical Society, the American Society for Horticultural Science and the Scientific Advisory Board of the California Table Grape Commission.

After his retirement from Cornell in 1998, Dr. Creasy and his wife, Min ’60, bought a 160-acre farm in Aurora, New York, where they grew table grapes (grapes meant to be eaten fresh, rather than processed into jam, juice or wine) and published together. Dr. Creasy continued experimenting in his vineyard and established procedures to increase resveratrol levels in his grapes. Together with his son Glen Creasy, he co-wrote two editions of the book, “Grapes,” a crop production handbook published by the Centre for Agriculture and Bioscience International (CABI).

Leroy Creasy was born February 21, 1938 and grew up in the outskirts of New York City. After earning his bachelor’s and master’s degrees from Cornell, he earned a Ph.D. from the University of California, Davis, then spent one year as a National Science Foundation fellow at the University of Cambridge, England. He joined the Cornell faculty in 1965. Creasy is survived by Min, his wife of 62 years; sons James ’86 and Glen; and four grandchildren.

Written by Krisy Gashler
Dr. Alexander de Lahunta, known as Dr. D to all, Sandy to his colleagues, and just D to those personally close to him, was born in Concord, New Hampshire on December 3, 1932. Raised in Concord, he graduated from Philips Andover Academy Class of 1951. He remained a proud alumnus and followed their sports teams. His admission to the Cornell College of Veterinary Medicine's class of 1958 is the stuff of legend. The man who would go on to become one of the most important veterinarians of his generation was not initially selected. A student who had been admitted did not join the class and Alexander de Lahunta was admitted as an alternate. We owe a debt of gratitude to that unknown student. After graduating first in his class, he worked in a general practice in Concord, New Hampshire until 1960. He returned to Cornell as Instructor of Anatomy and Ph.D. student, obtaining his Ph.D. in 1963. The title of the Ph.D. thesis of the man who would become the world's premier veterinary neurologist was "Dehydrogenase histochemistry of bovine rumen epithelium".

He was appointed Assistant Professor of Anatomy in 1963. When he was assigned to teach neuroanatomy he received permission to do
neurologic examinations of hospitalized large and small animal patients on a referral basis and postmortem examinations and histopathology on those animals that did not survive. He continued that pattern for the rest of his career and it was the basis for his astonishing ability as a diagnostician. He rose through the ranks, becoming full Professor in 1973 and James Law Professor in 1992. He was Director of the Veterinary Medicine Teaching Hospital 1976-1982 and Chair of the Department of Clinical Sciences from 1977-1986. Note that from 1977-1982 he was both Department Chair and Hospital Director, each a major task. He then became Chair of the Department of Anatomy from 1986-1991. He was honored repeatedly for his teaching, research, and service by Cornell and national and international organizations, culminating in his being the inaugural recipient of the American College of Veterinary Internal Medicine Lifetime Specialty Achievement Award. A bronze plaque has adorned the wall outside of his long-term office since shortly after his retirement with his picture and the inscription: Alexander de Lahunta, D.V.M. '58 Ph.D. '63, Professor 1963-2005, The Beloved "Dr. D". Such was the esteem in which he was held that an anonymous donor endowed the Chair's position in the Department of Clinical Sciences in his honor, now the Alexander de Lahunta Chair.

Dr. de Lahunta published about 300 scientific papers, including 30 published after his retirement. He was author or co-author of the textbooks 'Veterinary Neuropathology', 'Applied Veterinary Anatomy', 'Miller's Anatomy of the Dog', 'Miller's Guide to the Dissection of the Dog', and 'The Embryology of Domestic Animals'. Veterinary neurology was emerging as a specialty in the early 1970s. His book 'Veterinary Neuroanatomy and Clinical Neurology' published in 1977 and now in its 5th edition was a foundational text and he is widely considered the founder of the specialty of veterinary neurology. At the time of his retirement he was, within the veterinary profession, almost certainly the most famous veterinarian in the world.

Amazingly for someone with the career described above, Dr. D felt his greatest accomplishment was teaching the introductory anatomy
and embryology courses to the incoming freshmen each year, which allowed him to get to know every student in the class. To our knowledge he never took a sabbatical or accepted a speaking engagement during any academic semester. Every veterinary student during his time on the faculty was taught and known by Dr. D. His course later in the curriculum, 'Neuroanatomy and Clinical Neurology' was a highlight. Combining lectures, movies, videos, live animals, slides, necropsy specimens, and blackboard drawings, it was meticulously organized and produced a deep knowledge of neurology. Students were known to throw themselves into studying for his courses because they did not want to let him down by performing poorly on an examination. The criteria by which teachers can be evaluated include knowledge of subject, organization, enthusiasm, and respect for students; we never saw a teacher who surpassed him in any of them.

He collected thousands of case histories, laboratory findings, imaging results, and tissues for microscopic examination of animals with neurological disease. Many cases were sent to him from veterinarians worldwide who were requesting consultations. Characteristic of everything he did, his responses were always immediate, with rigorous attention paid to every detail. Dr. de Lahunta used this material in addition to hospitalized clinical cases for his weekly neurology rounds. These “neuro rounds” were a Cornell tradition. They were always widely attended, educational, and challenging, especially since species from dogs to snakes to elephants were presented. He conducted these rounds with precision, and each show had a flair of entertainment, often enhanced by interchanges between Dr. D and his esteemed and brilliant colleague, the late Dr. John Cummings. He also administered, sometimes several times a year, one-on-one, practical or oral examinations so that he could better know each student and evaluate the application of their knowledge.

To accomplish so much Dr. D was efficiency personified. If you happened to drive near the Cornell campus at 5:00 AM you would often see him out for his morning run, even in the harsh Ithaca winters. Dr. D’s runs came after he had already examined all
neurological cases in the large and small animal hospitals, written a
detailed examination report on each, answered a portion of his
voluminous professional communications and prepared for his
morning classes. He was the consummate clinician. Each neurology
case was examined in a precise order and in great detail. Many of
his examinations were then recorded in some audiovisual format (he
mastered more celluloid, video, imaging, and computer technology
than most of us can name). Not wishing to bias his own findings, he
never wanted to know the clinical findings of others or be given a
tentative diagnosis before performing his own examination. For 30
years, these examinations of patients began at 2:00 AM, a fairly
taxing time of day for those many students, interns, residents, and
clinicians who voluntarily woke up early to join him and then often
returned home to bed! His afternoon hours were devoted to teaching
laboratories, neuropathology examinations (both gross necropsy and
microscopic examinations), and neuropathology rounds. It has been
said that a student might spend nine years in veterinary school
without seeing Dr. D have a bite of food, but if you went to his
office at noon, he could usually be found eating a sandwich brought
from home and either looking through his microscope or reading the
New York Times. Somehow he found time to answer numerous
outside consultation requests, help residents with projects, mentor
students, interns, and residents, and contribute to scholarly
publications. All of these tasks were performed in a timely manner
and with exquisite attention to detail. We have never known of a
scientific article, chapter, or book to be delayed awaiting Dr. D’s
contributions.

Dr. D retired in 2005. Shortly after Cornell graduation that May he
quietly returned to New Hampshire. The honors and testimonials
from a grateful Cornell Veterinary Medicine would have to wait.

One of the pleasures of these memorial statements is getting a view
of the person. Easily recognizable with his hair always clipped close
to his scalp, he was outgoing, positive, energetic, charismatic, and a
bit of a showman. He did not need a megaphone to reach the back of
a room. While friendly, he did not socialize or hang out in coffee
rooms or cafeterias. He managed to slip away before a chat went on
too long. The subject upon which he could be drawn out was Boston sports, including the Celtics and his Red Sox. He could be firm and direct when the task required it such as discussing a grade or evaluating an individual for tenure but was not critical of others.

Dr. Alexander de Lahunta died peacefully at his Rye, New Hampshire home, on Tuesday August 17, 2021, age 88, surrounded by loving family. As incredible as it sounds after reading his accomplishments, his family was his passion and he shared his love of the outdoors with them. They cycled, ran marathons, backpacked in the mountains, skied, played pond hockey and more. He shared 56 years of marriage with Patricia (Frink) de Lahunta who predeceased him in 2011. He was survived by his partner Shirley Reed Dutton, four children, and nine grandchildren.

We close with a description of an average day circa 1990. About 2:00 AM, his footsteps came down the hallway of Schurman Hall to the office he had occupied for about three decades. This was time to catch up on work at his desk and then to walk over to the clinic to pick up the clipboard listing his neurology consultations. He then led a pack of students and others through these “neuro rounds,” finishing up in time to run at 5 o’clock. By 7:00 AM he would sip his one cup of coffee and enjoy the daily bagel while reading the newspaper. This was his preparation time for the day that loomed ahead. By 8:00 AM he was giving lectures, attending lectures, teaching in the anatomy laboratories, performing postmortem examinations, examining tissues from deceased animals, or participating in meetings. The day would remain full until late afternoon when he returned to the office to write up notes, think about tomorrow’s lectures, and write or read. Friday afternoons were reserved for the old vet library reading room where he would often sit near his friend John Cummings, reading the newest journal articles that had appeared on the shelves that week. 5:45 PM. He walked out the door, never locking his office, simply walking out into the night. Elvis has left the building.

Written by Maurice White (chair), Thomas Divers, Susan Fubini, and John Hermanson
Donald (Don) K. Freebairn. passed away on November 26, 2021. Born in LaSalle, Illinois, January 30, 1929, he earned a B.S. in Agriculture in 1950 and an M.S. in Agricultural Economics in 1952, both from the University of Illinois. He then came to Cornell University, where he completed his Ph.D. in Agricultural Economics in 1957. Don then spent several years working for the Rockefeller Foundation as an agricultural economist in Latin America, with assignments on faculty at the National School of Agriculture in Chapingo, and in multiple roles within the National Agricultural Research Institute in Mexico’s Ministry of Agriculture. Don joined the Cornell faculty as an Associate Professor without tenure in February 1964, filling a vacancy left by Professor Solon Barraclough. He was conferred an appointment with indefinite tenure effective July 1970. Don retired from the Cornell faculty in summer 1987 as an Associate Professor in the Department of Agricultural Economics and a member of the International Agriculture Program of the College of Agriculture and Life Sciences. Don was then awarded the title Professor Emeritus of Agricultural Economics and of Latin American Studies.

Don spent sabbatical leaves at Cambridge University in England in 1971-72 on a highly selective John Simon Guggenheim Memorial Foundation Fellowship, and at Centro de Economia Agricola in Chapingo, Mexico, on a prestigious Fulbright-Hays Scholarship in 1978-79. He spent the summer of 1974 as a Visiting Professor at the University of Puerto Rico.

During his 23-plus-year career on the Cornell faculty, Don’s scholarship and teaching focused on the economics of agricultural development in Latin America, Mexico in particular. His principal research topics concerned land reform, institutional change, and
resource productivity. Underscoring both his fluency in Spanish and his commitment to communicate his research findings to Latin American audiences, half of his published papers were in Spanish. Don was exceptionally widely connected and well-respected by experts in and on Mexico. The interdisciplinary nature of that work often led him to collaborate with Cornell faculty from other units and disciplines. The clarity of Don’s writing was an asset in facilitating such interdisciplinary work.

Don taught a range of courses in agricultural economics and international agriculture, at both undergraduate and graduate levels. He played a significant role in training a generation of Mexican agricultural economists and in helping other Mexican agricultural scientists understand how economic principles might inform their own research. Throughout his time at Cornell, Don was very actively involved in the Latin American Studies Program (LASP), including serving as the program’s Director both from 1967-71 and again from 1975-79. In the words of the late Knight Professor Emeritus of International Studies Milton Esman, who served as Director of the Center for International Studies that includes LASP, Don “provided steady and conscientious leadership to an important activity with a large student and faculty constituency. He was successful in securing both government and corporate financial support for the program at a time when other area studies programs on campus were struggling.” He was especially effective in securing funding for graduate students working on Latin American agricultural issues.

Don taught both undergraduate and graduate courses and was a valued and respected adviser of both undergraduate and graduate students. As his M.S. advisee, Professor Scott Swinton ‘83, recalls “Don Freebairn was more than a mentor; he enabled me to realize a dream. I chose Cornell’s Department of Agricultural Economics in 1980 because it was one of two in the nation where M.S. students occasionally conducted field research in developing countries. Don Freebairn made that elusive goal possible for me. Rather than scoff, Don encouraged.” Indeed, he facilitated graduate student field research in Mexico financially, including seemingly contributing his
personal resources to help students make ends meet, and took time to personally host students at his in-laws’ home in Mexico and to introduce students to his extensive network of professional contacts throughout Mexico.

The late CALS Dean Emeritus Kennedy therefore naturally described Don as “a warm and friendly person … able to see beyond the narrow framework of specific rules and to understand the needs of students and faculty. … He is a good listener and an effective critic.” Don was therefore drafted to serve on various committees, perhaps most notably on a university-wide curriculum committee to evaluate current offerings and identify gaps in lecture or seminar courses with substantive international content.

Beyond his service at Cornell, Don also served as an Associate Editor of the *American Journal of Agricultural Economics* for the volumes published from 1975 through 1977. In that era, associate editors were essentially coeditors. Thus, Don handled about 25% of the submissions and the other Associate Dick Boisvert 25%. Each worked relatively independently selecting reviewers and making decisions. Editor Bill Tomek observed that Don was intelligent and widely read and that he was sympathetic to interdisciplinary papers. The Food and Agricultural Organization of the United Nations regularly engaged Don as an expert consultant on various matters concerning Latin America.

Don is survived by his children, Elizabeth Freebairn, Ken Freebairn, and William Freebairn.

*Written by Chris Barrett*
Bruce P. Halpern

August 18, 1933 – January 31, 1922

Bruce Peter Halpern was a tireless fighter for the advancement of chemosensory science, for the promotion of his department, and in support of his family. His strict opinions on the conduct of science, his resolute fairness in the allocation of resources, and his pugnacious advocacy for the psychology department made him sometimes difficult for the university to interpret. Academics happy with clever political moves, shifting loyalties, and unstated goals would find no friend in Bruce. But any report of his staunchness does injustice to his delightfully eccentric sense of humor. And the psychology department, which he chaired for a full twelve years, was routinely regarded as a marvel by outside reviewers for its collegial air, active collaborations, functional faculty meetings, and general spirit of fun. On the day he retired from his second stint as chair, the department celebrated “Bruce Day.” Students, faculty, and staff all donned his professional uniform of choice—a white lab coat over shorts, black shoes and socks—to present him with accolades he had earned, many in limerick form.

Bruce Halpern lived through, and then presided over, the formation of several areas in the neuroscience of perception. After receiving
his B.A. at Rutgers University in 1955, he did his doctoral work with Carl Pfaffman at Brown, who first developed the methods for studying the response properties of taste receptors in mammals. Pfaffman discovered that receptor sensitivities were a very inexact map to the basic taste “properties” of salt, sweet, bitter, and sour. This observation set up the fundamental problem of the nature of neural coding in taste and chemosensation. Bruce pursued this problem throughout his scientific life, beginning with his Ph.D. in 1959. At that time, he also began his lifetime partnership with Pauline. They married in 1956, and she worked with him in building a laboratory and in building the rest of his life.

Bruce next worked as a postdoctoral associate in the Veterinary School at Cornell, blending that into an Assistant Professorship at SUNY Upstate Medical Center in Syracuse. Two of his enduring research lines were established—the first on how the psychophysics of taste interacted with the machinery and timing of ingestion, and the second on how taste was integrated into the perceptual needs and motor systems of various birds and animals. He moved back to Cornell as Associate Professor in 1966, with appointments in both Psychology and Biology. He ascended academic ranks and retired as the Susan Linn Sage Professor Emeritus of Psychology and Professor Emeritus of Neurobiology and Behavior.

With students and collaborators, Bruce’s major contributions were to show how taste must be understood in the context of its functional anatomy and neuroanatomy—in particular, the oscillations of licks, the residence times of sips, and the downstream effects of motivational states. Naturally-occurring taste modifiers proved important windows into taste coding, showing how some plants amplified it and some disrupted it. The normal bidirectional flow of fluids in the mouth led to research on the same phenomenon in olfaction, the orthonasal (outside air to nasal cavity) and retronasal (back of the mouth up to the nasal cavity) perceptions of odorants. While these concepts elaborated into established research areas, new institutions and societies began to advance and showcase them. AChemS, the Association for Chemoreception Sciences, had its first meeting in 1979, and Bruce Halpern was its president in 1982-83.
From 1987-1990 he was Chair of the Gordon Research Conference of Chemical Senses. Multiple new institutions, national and international, employed him as consultant.

Bruce embraced the computerization of every facet of professional and personal life. At Cornell, he became a member of virtually every committee, advisory board, and strategic planning group with digital focus (e.g., “Blue Ribbon Commission on Acquisition of Computing and Communication Equipment”). In the department, some balkiness notwithstanding, he guided the establishment of e-mail, websites, and on-line subject recruitment sites. Bruce became the co-director of the “Cognitive Studies in Context” program, the forerunner of the present Cognitive Science program and major. Some debate remains whether the initial massive bequest of computers to the department was less important to its eventual success than the philosophical debates in Cognitive Studies at the time.

Bruce’s role as Chairperson (1974-1980) and then Chair (1990-1996) of Psychology was transformative, especially considering that the typical term was three years. He was an advocate for the department, and for its individual members, in every way. Every faculty line, piece of real estate, general-purpose laboratory equipment, channel of course support, and allocated teaching load was on the line, and he gave no quarter. He was meticulous in the fair distribution of resources across the department, and in multiple years refused to make salary-raise distinctions between faculty. He survived several contentious and litigious debates that erupted in the early years of affirmative action, and actively enforced the procedures that evolved from those debates.

Students often rated Bruce’s classes as the best in the Psychology Department. Just as it was impossible to know, when he was Chair, of Bruce’s personal opinions on any issue debated in a faculty meeting, it was impossible for students to know what he “wanted” for answers in a seminar. A devout teacher in the Socratic method, he posed questions in answers to students’ queries to lead them to deeper understanding. At first profoundly perplexed, his students
then fully embraced this style of learning.

His children, Michael and Stacey, were a central focus of his life, and few informal conversations with him omitted mention of their progress. Pauline Halpern had left the laboratory to become a beloved mathematics teacher in the Ithaca Public Schools. Bruce and Pauline both retired to Kendall, where they continued public works and volunteerism, celebrating their 65th anniversary in 2022.

Written by Barbara L. Finlay and James E. Cutting
Peter Harriott ‘49, professor emeritus of chemical engineering in the Robert Frederick Smith School of Chemical and Biomolecular Engineering died September 13, 2021, in Ithaca, New York, at the age of 94.

In a Cornell career that stretched 48 years Peter was widely known as a dedicated and generous teacher, colleague, and mentor as well as a chemical engineer with a deep knowledge of the fundamentals of unit operations. Outside of Cornell, he is best known for the classic textbook “Unit Operations of Chemical Engineering,” which is still widely in use and is considered by many to be one of the most comprehensive introductory undergraduate chemical engineering textbooks ever written. The book is currently in its seventh edition, with Professor Harriott adding chapters with each new edition, up to and including the most recent in 2005.

Peter Harriott was born in Ithaca in 1927 to a mother and father (John Frederick and Stella (Fahl) Harriott) who were both proud members of the Cornell University Class of ’22. In a recorded interview arranged by Cornell, Peter revealed that in the seventh
grade his teacher asked him to predict his own future and without missing a beat he said, “I will go to Cornell University and I will be a chemical engineer.” Which is exactly what he did.

Peter graduated from Cornell with a degree in chemical engineering in 1949. He earned his doctorate from MIT in 1952 and worked for General Electric in Waterford, New York, for a year before getting an unsolicited call from Professor Charles Winding at Cornell, offering a faculty position. Professor Winding had seen a bound copy of Peter’s lecture notes and problem sets from the Distillation class he taught at MIT as a grad student and was so impressed he asked Peter to come and teach at Cornell. Peter jumped at the chance and joined the faculty of what was then the School of Chemical Engineering in 1953.

He worked closely with some of the school’s founders, including professors Fred H. “Dusty” Rhodes and Julian Smith. Peter then spent the next 48 years teaching undergraduate and graduate chemical engineering students about process control, chemical reactor design, air pollution control, membranes and synthetic fuels. He supervised graduate research in process control, mass transfer, kinetics, air pollution control and reactor design until his retirement in 2001.

For many years after retirement, Harriott continued to give guest lectures in several classes at the Robert Frederick Smith School of Chemical and Biomolecular Engineering. He especially enjoyed joining first-year students on their final day of the semester so that he could teach them his “Reynold’s Number Song” about predicting fluid flow patterns.

“In many ways, Peter was the last of his generation of Cornell chemical engineers,” said Susan Daniel, Fred H. Rhodes Professor and William C. Hooey Director of Chemical and Biomolecular Engineering. “He was a founding father of the department and a real giant in the field.” Jeff Tester ‘66, M.S. ‘67, the David Croll Sesquicentennial Fellow and professor of chemical and biomolecular engineering, was both a student and a colleague of
Harriott’s. “I was privileged as a senior ChemE student to have Peter as the instructor, he was always forthcoming to make sure we understood the key issues.” Tester said. “Later in my career, I had a chance to interact with him on several research topics. He had a unique ability to focus his knowledge of chemical engineering fundamentals and operations on solving complex engineering problems.”

Peter was a National Science Foundation Postdoctoral Fellow, and a member of the American Chemical Society and the American Institute of Chemical Engineers. In 2008, he was presented the Warren K. Lewis Award for Chemical Engineering Education by the American Institute of Chemical Engineers in honor of his deep commitment to his students and to the field.

The same year that Peter joined the faculty at Cornell, he met and married his lifelong partner, Mary-Lou (White) Harriott. The two met through their membership in the Albany Chapter of the Adirondack Mountain Club and their love of the outdoors continued through the rest of their years together. He later said it was by far the most momentous year of his life because marrying his wife and teaching at Cornell were the two best decisions he ever made. He and his Mary Lou designed and helped construct their house in Ellis Hollow in 1955, where they raised five sons, all of whom studied engineering.

Peter’s sons have fond memories of playing softball on a field their father created on land just to the east of the Ellis Hollow house. Peter was pitcher, umpire, and final arbiter of any disputes that arose during these games.

Away from work, Peter had a deep and abiding love of nature and the outdoors. This was evident in his active memberships in the Nature Conservancy and the Adirondack Mountain Club, his founding of the Cayuga Trails Club, and his extracurricular work with the Tompkins County Environmental Management Council. He was a Boy Scout leader for many years.
He also loved singing and for most of his adult life he was part a chorus or singing group.

Peter Harriott was predeceased by his wife, Mary-Lou Harriott, and a son, John Harriott. He is survived by sons George Harriott, James Harriott, Paul Harriott, and Douglas Harriott, as well as seven grandchildren and two great-grandchildren.

Written by Chris Dawson
Dr. Geza Hrazdina, emeritus professor of Food Science & Technology, passed away in Geneva, New York, on June 2, 2022. He is survived by his wife, Minou Hemmat Hrazdina; son, Geza K. Hrazdina; daughter-in-law, Kate; and granddaughter, Katherina. Geza will be remembered by his colleagues for his seminal scientific contributions to plant biochemistry and biotechnology as well as his passion for mentoring students and advisees.

Geza was born in Letenye, Hungary, on March 16, 1939. He left Hungary in 1958, two years after the Soviet invasion, and pursued his education at the Swiss Federal Institute of Technology (ETH) in Zurich. Geza earned his master’s degree in Agricultural Chemistry (1963) and his doctorate in Agricultural Biochemistry (1966) from ETH. Following a postdoctoral position at Cornell University, he was hired as an assistant professor of Food Science & Technology (1968) at the New York State Agricultural Experiment Station (NYSAES), later renamed Cornell AgriTech. He was subsequently promoted to associate professor (1973) and professor of biochemistry (1981). He retired and was elected to Professor Emeritus in 2007.
As a Cornell faculty, Geza’s earliest studies focused on identifying and characterizing plant secondary metabolites, including a class of pigments called *anthocyanins*. These compounds are responsible for the red and purple color of wine, apple skins, and many other fruits and flowers. Anthocyanins can possess subtle variations in chemical structure which affect their appearance and stability, which can strongly affect their value to both farmers and the food industry. Geza’s lab became well-known for performing some of the earliest characterizations of different anthocyanins found among plants, a fact made more remarkable due to the limited chromatographic separation tools available at the time. In addition to his foundational work on anthocyanins, Geza made contributions to understanding of the molecular biology of other plant metabolites associated with aroma, disease resistance, and growth. Geza also published extensively on the organization of secondary metabolites within the plant cell and the identity and location of enzymes associated with metabolite production. Geza’s work on anthocyanins and other natural plant products is still widely cited by food scientists, plant breeders, and horticulturalists as part of efforts to develop new high value plant cultivars, refine our understanding of plant metabolism, and improve food quality during processing.

Geza was a pioneer in the field of plant biotechnology, especially his recognition of the potential value of moving key metabolic enzymes from one plant to another, or from plants into cell cultures. Such ideas have become commonplace in modern plant breeding and synthetic biology, but they were in their infancy in the 1990s when Geza served as co-chair of the Cornell Genomics Initiative. This initiative coordinated efforts across the university to ensure better investment in core facilities at Cornell for emerging life science tools, especially DNA sequencing. The initiative was also responsible for hiring a new generation of genomics-focused biologists and has resulted in Cornell’s current reputation as an international leader in the life sciences.

Geza was also a valuable contributor to the sciences outside of Cornell. He served on the advisory and executive committees of the
Phytochemical Society of North America in several capacities, including serving as president from 1982 to 83. He was the program director for the National Science Foundation’s Division of Cell Biology and was awarded an Alexander Von Humboldt research fellowship in 1973 and 1982.

Over his career as a professor, Geza served as an advisor and mentor to dozens of graduate students, post-doctoral associates, and visiting scientists. His generosity with his mentees could be extraordinary. One student in the plant sciences recalled meeting Geza for the first time to discuss a project related to grape anthocyanin quality, and by the end of the conversation Geza had offered the student full access to his library of painstakingly isolated anthocyanin standards. Along with his admirable scientific contributions, these types of acts – kind, generous, and transformative – keep Geza’s memory alive among his former students and colleagues at Cornell.

Written by Gavin Sacks
Richard Allison Ledford, professor emeritus of Food Science and chair of the department for a total of 17 years, died in Flat Rock, North Carolina on October 9, 2021 at the age of 90.

A native of Charlotte, North Carolina, Richard grew up on dairy farms in the Charlotte area. He served as an officer in the U.S. Army and received a B.S. in Food Science, an M.S. in Food Microbiology from North Carolina State University and a Ph.D. in Food Microbiology from Cornell University. He served a three-year term as Director of the New York State Food Laboratory in Albany (the lab analyzes samples of foods taken during inspections of food facilities throughout New York) before rejoining Cornell as an assistant professor in the Department of Food Science in 1964. Richard rose through the professorial ranks and twice served as Department chair. He retired in 1996 to his native North Carolina (to a life of Golf).

Growing up during the Great Depression, Richard came from a family of very modest means. The only reason he ended up studying at North Carolina State University was because a local farmer took a
special interest in him and encouraged him to pursue his dreams. Professor Ledford was a wonderful mentor and his love and support of graduate students was the result of that special farmer’s believing in him and that was his way of paying it forward! He successfully mentored 32 graduate students who went on to make their contributions to a better world.

Dick Ledford was a very thoughtful, mild-mannered, soft-spoken individual who possessed a kind and gentle demeanor. He was an excellent microbiologist who always paid attention to detail. He sincerely cared for people and treated everyone he encountered with dignity and respect. Richard was an effective leader, who lead our department through a significant period of growth.

Dr. Michael Dunn, one of Richard’s former doctoral students and currently Professor and Food Science Coordinator in the Department of Nutrition, Dietetics, and Food Science at Brigham Young University, remembers Richard as follows: “I remember Dr. Ledford as a very kind and understanding advisor. He was patient and encouraging and his gentle, soft-spoken manner always made me feel better and more hopeful about my potential for success. Without his kind assistance and wisdom, I would not be where I am today.”

Professor Ledford’s field of specialization was the study of dairy and food microbiology and its application to cultured dairy products. His “effort distribution” was 50% Research, 45% Teaching and 5% Extension. Over the years he taught a variety of courses including Food Microbiology and Food Microbiology laboratory (FS 394-395), Food Analysis (FS XXX), Food Fermentations (FS 406), as well as Senior Seminar (FS 400) and Contemporary Perspectives in Food Science (FS 102), an orientation for incoming freshmen. The Senior Seminar was a required course where every senior would have the experience of presenting a proper scientific seminar. It also included vital advice on preparing a resume and an accompanying cover letter for students seeking employment after graduation.

Richard had a very active presence in the Department’s Extension program, even though his effort distribution was only five percent.
He provided assistance to laboratories associated with the New York State food industry and was always available to lend his expertise to solve industry problems whenever they occurred. He was a valued member of the New York State Association for Food Protection (formerly NYS Association of Milk & food Sanitarians). He served for many years on the Laboratory Practices committee, was elected president of the Association for 1989-90 and received the Associations highest honor, the Emmett R. Gauhn Memorial Award in 1995. On his retirement from Cornell in 1996, he was made an Honorary Life member of the Association.

During his second tenure as department chair, he made another outstanding contribution to the extension/outreach effort. When the 31,600 square-foot Food Processing and Development Laboratory was completed in 1988, he supported the conversion of the old Stocking Hall cheese lab into a 72-seat extension conference center. This provided a dedicated space for on-campus extension programing and department meetings and social events. It proved so successful, that it became a model for the design of Extension conference space when Stocking Hall was renovated in 2015.

Dick’s research activities focused on dairy and food microbiology and especially its application to cultured dairy products like yogurt, cottage cheese and sour cream. His work included the study of the Lactococci, projects to improve milk quality issues, survival of coliform bacteria, and the influence of proteolytic enzymes in food fermentations. He concentrated on improvements in the production of fermented dairy foods by upgrading the technology associated with starter cultures and he and his graduate students published widely in this area. In addition, he also conducted research to indirectly improve the microbial quality of foods by developing and/or refining rapid microbial enumeration methods. Some of his work in this area included the growth inhibition of Staphylococcus aureus in Cheddar cheese whey.

In recognition of his significant work in the area of cultured dairy products, Professor Ledford received the 1987 American Cultured Dairy Products Institute Research Award for excellence in research.
at the Institute’s annual Meeting in Nashville, Tennessee. It consisted of a recognition plaque and a $1,000 prize.

He was active in the following Professional Societies including the Institute of Food Technologists, American Dairy Science Association, American Society for Microbiology, International Association of Milk, Food and Environmental Sanitarians, New York State Association of Milk and Food Sanitarians (president 1989-90) and Cornell Chapters of Sigma Xi and Phi Kappa Phi. Dr. Ledford served on a number of Cornell Committees and also generously gave his time to serve on several important committees of the professional societies in which he was a member.

In addition to his academic achievements, Professor Ledford started his administrative career as acting head of the Department during Dr. Holland’s final sabbatical leave (February 1 to September 30, 1972). On October 1st, Richard was appointed department chair for a five-year term. He was called again to chair the department from 1985 until his retirement in 1996 – a total of 17 years and eight months at the helm.

Upon retirement, he and Martha moved to Lake Lure, North Carolina. Along with golf, another of Richard’s hobbies was wood carving, a passion he shared with his long-time Food Science colleague John Sherbon. Richard and John created beautiful life-like carvings of waterfowl which they often entered in competition at the New York State Fair and also gave as gifts to family and friends.

Richard Ledford was a devoted husband and father. He is survived by his wife of 64 years, Martha Worley Ledford, his daughters Ann Boberg (Roger), Jeanne Christman (Greg), sons Roeby Ledford (Beth) and Robert Ledford (Shannon). (Their oldest son, Rick Ledford (Brenda) passed away in 1994). He is also survived by nine grandchildren and five great-grandchildren as well as his sister Patti Sandford. Richard was preceded in death by his parents Travis and Sarah Moon Ledford, his brother Ronald (Carolyn) and sister Beverly Huneycutt (Newton).
Professor Ledford was a kind and gentle man, with effective leadership skills. He served our department and Cornell University with distinction!

Written by David Bandler, Robert Gravani, and Dennis Miller
Everett Donald Markwardt, Emeritus Professor of Agricultural Engineering at Cornell University, passed away December 11, 2021 at Schuyler Hospital in Montour Falls, New York at age 100. He was born September 5, 1921 in forever windswept Bisbee, North Dakota, the son of Albert and Annie Oakland Markwardt.

Affectionally known as Ev, he graduated from Bisbee High School, and attended North Dakota Agricultural College in Fargo where he received his B.S. degree in June 1943. Fortuitously, there he met Robert T. Lorenzen who would become a future colleague with him on the faculty of the Agricultural Engineering Department at Cornell University in 1959.

In 1943 – 1946, during World War II, Ev served as Group Armament Officer in the U.S. Army Air Corps as a Second Lieutenant, stationed at Edwards Air Force Base ("Army Air Base, Muroc Lake") in California where final combat training for bomber and fighter aircrews was made just before their overseas deployment. Upon discharge from the Air Corps, he farmed 960 acres in Bisbee for a short time with his father.
He was appointed a District Agricultural Engineer in the Agricultural Engineering Department at Cornell in 1946 which placed him in the field and eventually brought him into contact with Velma E. Nice whom he married on June 4, 1949 in Akron, New York. Their loving partnership lasted 72 years. He was appointed Instructor in Agricultural Engineering and entered the Graduate School at Cornell University in September 1949, received his M.S. degree in September 1951, and was appointed Assistant Professor in the Department of Agricultural Engineering in the College of Agriculture with primary responsibilities in irrigation systems and agricultural machinery. Ev was promoted to Associate Professor with tenure in July 1955, and to Professor in July 1961. He retired in December 1981 and was appointed Professor Emeritus.

Ev’s principal responsibilities lay in Extension and research, but he also participated in teaching special topics as an invited lecturer in the departments of Vegetable Crops and Pomology. With respect to Extension, in 1947 there were 12 District Agricultural Engineers supported by six Extension faculty based in Ithaca in the Department and Ev saw the need for a shift from direct service through farm visits to moving to a program with educational emphasis, including integrating the engineering into commodity-based programs of the counties. By 1956 it became evident that a staff of college-based specialists in specific discipline areas would better serve the Engineering Extension program and the county agent staff. Consequently, Department Head Orval C French (yes, the letter C was Orval’s middle name, with no period!) and Ev reorganized the department Extension staff into 12 specialized program areas and reassigned some of the District Engineers to Specialist positions. Markwardt was named Extension Project Leader, a position he held for over 27 years until his retirement in 1981, making him the longest serving project leader in the history of Cornell Cooperative Extension. He also recognized the need for regional cooperation and promoted the establishment of a Northeast Regional Agricultural Engineering Service (NRAES). This avoided duplication of effort, reduced costs, centralized the publication and distribution process, and provided a vehicle for increased regional
program cooperation. The NRAES headquarters was designated to be at Cornell University. Ev served as the first chairman of the Executive and Operating committees, and leadership was rotated among the states. NRAES became a major source of engineering educational materials for the member states, while requiring minimal staff and facilities to produce them. In 1998, the name was changed to the Natural Resource, Agriculture, and Engineering Service, and the acronym NRAES remained. NRAES is now known as Plant and Life Sciences Publishing (PALS). Eight universities are members of the cooperative effort -- a real tribute to Markwardt’s vision. He also originated the departmental publication *Agricultural Engineering* in 1956 to bring a variety of engineering-related information to as broad an audience as possible on a regular and timely basis.

In addition to his work on the design and management of efficient irrigation systems, Ev was the leading figure in the Department’s efforts to mechanize the harvesting of fruits and vegetables, eventually including apples, cherries, grapes, cabbage, and lettuce, beginning in 1959. He obtained funding from a variety of sources to develop techniques and mechanical equipment to harvest cherries utilizing a special collecting frame and determined the optimal frequency and stroke length for mechanical tree shakers for effective fruit removal; colleague Professor J. Robert Cooke later confirmed the frequency requirements mathematically. Within a few years, 95% of cherries were mechanically harvested. It took about four seconds to harvest the fruit mechanically, a great saving in time and labor.

Ev was also the leader of a team that designed and developed a mechanical harvester for processing apples. He raised funds from processors, growers, apple associations, and State and Federal sources, and developed tree shaking, fruit catching and collection techniques and design parameters that were adopted by commercial equipment manufacturers. In 1972, approximately 25% of apples harvested for processing was performed mechanically.

He was also involved in numerous studies and educational programs.
to improve potato planter and harvester performance, vegetable seeders, tomato harvesters, grape brush choppers, pruning and brush removal in orchards, pesticide applicator performance for fruits, vegetables, potatoes, and field crops, as well as apple grading and packing equipment.

Ev authored scores of articles, bulletins, reports, and papers related to his Extension and research efforts. He was recognized nationally for his contributions to Extension by the American Society of Agricultural Engineers (ASAE, now ASABE - American Society of Agricultural and Biological Engineers) with four Blue Ribbon Awards. In 1980, he received a Special Citation from the New York State Association of County Agricultural Agents, and in 1981 received a Recognition Plaque from the Directors of Cooperative Extension. He was a member of ASAE, Epsilon Sigma Phi, Sigma Xi and Blue Key. He served on numerous subject matter committees across the College, as well as regional Extension committees, and College hiring reviews. Simply put, he was absolutely outstanding in his work.

Ev was an active member of St. Luke Lutheran Church, serving on the building committee during renovations, and on the church Council as Treasurer. He was a founding member of the Ithaca Swim Club and was the longtime head of the New York Southern Tier Swim Officials with certification for NCAA, High School, YMCA and AAU meets. He was also active with local Boy Scout Troops and the Cayuga Heights Fire Company, serving as a Captain.

It was always a great pleasure to be invited to a gathering at the Markwardt home. Ev and Velma were gracious hosts, great cooks and made guests welcome and at ease. Ev specialized in barbecuing, and who could resist Velma’s homemade rolls! They lived on the edge a golf course and one could but wonder why a window hadn’t been broken by an errant golf ball that entered their yard. Ev would proudly display his backyard year ‘round fishpond and tell about his recent attempts to keep deer from consuming the neatly manicured vegetation around the yard, including his dwarf Japanese Maple tree. The Markwardts made their guests feel like part of a family -- a real
treat and greatly appreciated. In his retirement, Ev also dabbled in homemade wine making in his basement and produced a tasty product with his own label.

A video about the legacy of Everett D. Markwardt, conducted by Norman R. Scott can be found on the ecommons website.

Everett is survived by his beloved wife, Velma Nice Markwardt; son, Douglas (Marcia) Markwardt; son, Kevin (Laura Cuomo) Markwardt; daughter, Carol (James) Wood; grandson, Dustin (Mindy) Markwardt; grandson, Kyle Markwardt; grandson, Jakob Markwardt; granddaughter, Kayla Markwardt and great grandson, Cedar Allen Markwardt. In addition to his parents, he is predeceased by his brother, Stan Markwardt and sister, Ruby Markwardt Bishop.

Written by Ronald B. Furry (chair), Norman R. Scott, and Howard A. Longhouse
Trevor Pinch, Distinguished Professor of Arts and Sciences in Science & Technology Studies (S&TS) at Cornell University, died at the age of 69 from cancer. In addition to his position in the S&TS Department, he also held an appointment in Sociology, and his research and teaching crossed many disciplinary boundaries in the arts, sciences, and humanities. A memorial celebration of his life was held on January 1, 2022, which would have been Trevor’s 70th birthday, at the Forest Home Chapel near where he lived for most of his time at Cornell. Further memorial sessions and gatherings will be held at the Society for Social Studies of Science annual meeting in December 2022, and on the Cornell campus in September 2023.

Trevor grew up near Norwich, England and remained a life-long fan of the Norwich Football Club. A few months before he died, and despite the advanced stage of his disease, he traveled to Norwich to attend a match. His youthful recreational interests included sailing in the Norfolk Broads and playing in a local rock and roll band. He even built his own music synthesizer and used it in the band. He also managed to excel as a student. He received a Bachelor of Science degree in Physics from Imperial College, London, but then decided
that he was more interested in studying science and technology from a sociological and historical perspective. He gained admission to the post-graduate program in sociology at the University of Bath, where he received his Ph.D. in 1982 for a dissertation on the development of solar-neutrino research. During his studies at Bath, he began a long-term collaboration with his dissertation advisor, Professor Harry Collins, resulting in a series of books and articles. After receiving his Ph.D., Trevor worked as a Lecturer and Senior Lecturer in Sociology at the University of York, before moving to the U.S. to take up an Associate Professor position at Cornell in 1990 when the new Department of Science & Technology Studies (S&TS) was being formed (he was promoted to Professor in 1994).

As a central member of the S&TS Department for the remainder of his life, Pinch served as Department Chair and Director of Graduate Studies for much of that time. While acquiring international recognition for his research, he also was an active and revered teacher of large undergraduate courses and mentor of numerous Ph.D. students in S&TS, Sociology, and other graduate fields at Cornell. Many of his students went on to careers at major universities in Sociology, Science & Technology Studies, History, Communication and Information Science, and other fields. Pinch loved and excelled at teaching. Despite having been diagnosed with terminal cancer in 2017 and undergoing repeated and debilitating surgeries and chemotherapy treatments in hopes of arresting it, he maintained his teaching activities to the very end. Testimonies from his former students following his death uniformly praised the way he inspired them, and the way he conveyed his broad and multifaceted knowledge in an endearingly informal and self-effacing way. A former student, Pablo J. Boczkowski (Ph.D., Cornell S&TS, 2001), who is now Professor of Communication Studies at Northwestern University, recalled his first meeting with Trevor: “I was invited for brunch at his house and as a proper porteño I showed up very dressed up … only to be greeted by the world-renowned scholar wearing an orange t-shirt with a hole in it and two different socks! I remember thinking that he didn’t seem to take himself too seriously and I really liked that.” Adelheid Voskuhl (Ph.D., Cornell S&TS, 2007), Associate Professor in History and Sociology of
Science at the University of Pennsylvania, remarks that “Trevor was a giant, as a person and as a member of our field. We can see his imprints on every aspect of it, institutionally, socially, intellectually.” Nicole Nelson (Ph.D. Cornell S&TS, 2011), Associate Professor in the Department of Medical History and Bioethics at the University of Wisconsin, Madison observed that “Trevor had a great way of taking students' ideas seriously but also reminding us that the stakes are not really so high, and that academia can and should be a place where there's great fun to be had in tossing around ideas.”

Professor Pinch’s research made remarkably broad and diverse contributions to the social sciences and humanities. His personal openness and wide-ranging intellect enabled him to expand his horizons through collaborations. The majority of his 18 books and edited volumes and more than 150 articles, are written and edited with others. By drawing upon his own knowledge and practical skills, as well as those of his many collaborators, he was able to give original and informative treatments to the interrelations between social and technical activities. Despite the variety of fields and topics he covered, his work was unified under a social constructionist perspective that reveals the depth to which communal affiliations and rivalries pervade scientific discourse and practice.

Although his contributions to sociology of science were substantial, Professor Pinch is best known for his work in developing a social constructionist treatment of technology. His edited volume (with Wiebe Bijker), The Social Construction of Technological Systems (MIT Press, 1987) was an immense success for establishing a framework for conceptually and methodologically integrating science studies with historical and social studies of technology. Their book was a major landmark for establishing the field of STS (an acronym conveniently covering both Science, Technology and Society and Science & Technology Studies).

During his years at Cornell, Professor Pinch became prominent in yet another novel trans-disciplinary area in the humanities and social
sciences: Sound Studies, a field encompassing such topics as the history of musical instruments, the urban “soundscape”, the use of sound in research as a method of observation, and controversies surrounding cochlear implants. His most notable contribution to Sound Studies was *Analog Days* (co-authored with Frank Trocco; Harvard University Press, 2002), a history of the development of the Moog synthesizer and its importance for popular music. He also played the synthesizer (including the one he assembled in his youth) and performed with James Spitznagel in a duo fittingly named The Electric Golem.

Professor Pinch served as President of the Society for Social Studies of Science (4S) and received numerous awards and honors. These included the J.D. Bernal prize for career achievement from the 4S, and the Robert K. Merton Professional Award from the Science, Knowledge and Technology Section of the American Sociological Association for his book with Collins, *The Golem: What You Should Know about Science* (Cambridge University Press, 1993).

Testimonies by his collaborators and other international figures in the fields in which he worked acknowledge how much more there was to Trevor as a person than his impressive achievements indicate:

I wanted to say how important and kind and fun and brave Trevor has been to the whole STS community. — Bruno Latour

Saying that he has been immensely important to our field, is repeating something you all know. Not just from his impressive range and quality of publications, but because Trevor was life itself. Such a creative mind and lucid writer … sparkling with energy, full of humor … . Evenings with Trevor … were cheerful as the colorful stories he had to tell. … Trevor embodied the ideal colleague. — Wiebe Bijker and Karin Bijsterveld

The most important thing I learned from Trevor is gratitude.
I don’t mean the platitudinous “practicing gratitude” thing that goes around every so often. Trevor had this “I can’t believe I get to do this!” affect about him. He just lived it; if he worked at it, it produced the kind of effortlessness one finds in a master musician. — Jonathan Sterne

Trevor was a very sweet person and a very sweet friend. I have a very bright picture of him, smiling in that calm and friendly way that was so special. He helped me in many ways. — Richard Swedberg

It was that generosity of personal and intellectual spirit preserved from his early hippy years that made him such a great partner in our research and in our joint writing projects but also made it natural for him to shift to other projects when the music changed. He just went with the flow of felt goodness. And that’s why he had no enemies and that’s why everyone loved him and why we are all going to miss him. He was the only Trevor. — Harry Collins

Professor Pinch is survived by his wife Dr. Christine Leuenberger, who is a Senior Lecturer in S&TS at Cornell, and their daughters Dr. Benika Pinch, a Principal Scientist II at Novartis Institutes for Biomedical Research, and Annika Pinch, who is studying for the Ph.D. in Media, Technology and Society at Northwestern University, and his sister Alison Fey Vickers, who lives in Trimley St. Martin, Felixstowe, United Kingdom.

Written by Stephen Hilgartner, Ronald Kline, and Michael Lynch
Richard Louis Quass

April 11, 1944 – October 19, 2021

Richard (Dick) Louis Quaas passed away Tuesday, October 19, 2021. Richard “Dick” Quaas was born on April 11, 1944 in Cedar Rapids, Iowa, and grew up on his family farm in Alburnett, Iowa. His interest in livestock was evident at an early age leading to his involvement in 4-H and FFA. Dick attended Iowa State University and earned a bachelor’s degree in Animal Science. After graduation, he entered the Peace Corp and spent time in Ecuador in South America. Upon his return to the United States, he attended Colorado State University where he earned M.S. and Ph.D. degrees in Animal Breeding. In 1973, Dick was appointed Assistant Professor in Animal Science at Cornell University. As a member of the Cornell faculty, he rose through the ranks to Professor of Animal Breeding in 1989. In 2010, upon his retirement, he was named Professor Emeritus of Animal Science, College of Agriculture and Life Sciences, Cornell University.

Professor Quaas’ career was devoted to Animal Breeding and Quantitative Genetics. His departmental program included statistics and the genetic improvement by selection of domestic populations, particularly cattle populations, and more specifically beef cattle. He
utilized phenotypic data collected on thousands of farms and ranches from all over North America for complicated statistical and computational analysis of these data resulting in a single number representing the genetic merit for a particular trait of each animal in a population that may number in the millions. The subsequent emergence and availability of molecular DNA techniques held the promise of making selection more efficient, e.g., commercial DNA tests for favorable alleles/markers for quantitative traits in beef cattle. As a member of the National Beef Cattle Evaluation Consortium (NBCEC) and quantitative trait loci team chair, his important research included validation and verification of associations between genetic tests and traits as claimed by a commercial genotyping company using phenotypes and commercial DNA tests from reference cattle populations. Analyzing such data proved to be a complicated statistical and computational challenge that appealed to Dr. Quaas.

Professor Quaas always said he was an animal breeding statistics guy and he became renowned and respected in his field. His acknowledged strength in animal breeding theory and computing strategy lead faculty colleagues to visualize him as the new young “Henderson” of the department. During his early years on the faculty, Dick was often seen sitting in his office, smoking his corncob pipe, obviously in deep thought, presumably contemplating some complex equation or new way to tackle a computational problem. Dr. Mike Van Amburgh, Professor of Animal Science at Cornell, recalled that “Dick had extraordinary mathematical skills. He was able to solve very complex mathematical problems in his head, much to the amazement of his colleagues.”

Dr. Quaas traveled internationally, attending seminars, speaking engagements, and receiving awards. Several sabbatical and study leaves in Queensland and New South Wales Australia and later in Zurich Switzerland provided experience with different cattle populations and researcher viewpoints. As recognition of his research contributions, Dr. Quaas received honors and awards from professional organizations including: 1982 Young Scientist Award, Northeast Sections of American Society of Animal Science and
American Dairy Science Association; the prestigious J.L. Lush Award in Animal Breeding and Genetics, American Dairy Science Association; and the 2006 Rockefeller Prentice Memorial Award in Animal Breeding and Genetics, American Society of Animal Science. However, he was particularly pleased with awards from beef industry organizations representing constituents his research directly impacted. These awards included: Beef Improvement Federation’s Pioneer Award and the World Simmental Federation’s Golden Book Award.

Dr. Quaas’ training and interest in animal breeding and quantitative genetics lead to teaching responsibilities exclusively in the graduate education program. For many years he taught ANSC 720, Advanced Quantitative Genetics, as the capstone course for students in Animal Breeding. His course, in addition to providing hands-on training in computer programming, helped perpetuate the department’s preeminence in this traditional area attracting numerous national and international students. Dr. Jerry Taylor, Curator’s Distinguished Professor Emeritus of Animal Science at the University of Missouri was a postdoctoral associate at Cornell and attended his class. “Dick was an amazing teacher and a brilliant statistician and geneticist. Very few people in the world of his caliber,” Taylor said. “He was also a wonderful mentor and colleague. He was at Cornell at a time when the animal science genetics group was considered the mecca for quantitative genetics. As unassuming as he was, Dick was a big part of that reputation.”

Dr. Quaas assumed responsibility as Director of Graduate Studies in the Field of Animal Science from 1981-2009. This position served the entire department for selection of graduate students and Dr. Quaas was noted for maintaining a high level of standards and for remaining true to the mission of Animal Science. Dr. Quaas also contributed to the undergraduate program in Animal Science as an academic advisor for 14-17 students each year throughout his career.

He is survived by his brother Max (Linda) Quaas of Decorah and sister Mary (Tommy) Moore of Alburnett, two nephews, Josh (Claudia) Quaas and Justin (Pasha) Quaas, and two nieces, Jennifer
(Jason) Johnson and Jill (Terry) Logston. Dick was affectionately known as “FUD”, Favorite Uncle Dick.

Written by W. Ron Butler (chair), E. John Pollak, and Thomas Overton
Stanton Shannon, Emeritus Professor of Vegetable Crops/Horticulture, and a world class vegetable physiologist, passed away on January 6, 2022, at the Pacifica Senior Living Center in Riverside, California. He was 93 years old.

Born and raised in Phoenix, Arizona, he was the third of four brothers. He grew up on the family’s citrus ranch where he first showed an interest in soils and plants. Aware of the soil fertility challenges he experienced at the family ranch, he studied soils at first, before developing an interest in plant physiology and biochemistry, receiving both his B.S. and M.S. from the University of Arizona. The first refereed publication of his career was published in the very first issue of Forest Science in 1955 and summarized his Master’s degree research that examined the effect of burning on forest soils.

In September 1953, Professor Shannon entered the U.S. Army for a two-year enlistment. Nine months were spent in the Chemical Corps teaching chemical, biological, and radiological defense. The remaining time was spent as topographical surveyor in the Army
Corps of Engineers, including three-months duty in Northwestern Alaska.

After finishing his service, he accepted a position with the University of California’s Citrus Experiment Station in Riverside, California, working in the soils department as a senior lab technician. One afternoon, while playing volleyball at the faculty club, his life would change forever, as he would meet his future wife, Muriel ‘Nickie’ Carter. They were married in December 1956 and would go on to celebrate 65 happy years together.

Soon after marrying, Professor Shannon moved to Davis, California to pursue a Ph.D. in plant physiology at the University of California. Finishing his degree in 1961, he was immediately offered a position as an assistant professor in the Vegetable Crops department at Cornell University, at the New York State Agricultural Experiment Station in Geneva, New York.

Professor Shannon researched a variety of vegetable crops during his 25-year tenure at Cornell. In particular, he developed new methods to perform rapid detection of curcurbitacins in squash. Curcurbitacins are highly toxic, bitter compounds that naturally occur in the family of plants that include cucumbers, pumpkins, melons, watermelons, and squash. These bitter compounds protect wild plants against predators, but they are undesirable in commercially grown fruits and vegetables. Early detection of these compounds enabled plant breeders to select better-tasting varieties.

He was also one of the first researchers to study how sex expression in cucurbit crops like cucumber could be manipulated with plant hormones and plant growth regulators. He worked closely with the vegetable industry and his research led to higher yields and a more concentrated fruit set in cucumbers. Professor Shannon, working with his colleague Bob Becker, established the first processing sweet corn variety trials at Cornell, a program which continues to this day.

In addition, Professor Shannon conducted studies on table beets,
examining everything from the optimum plant populations to produce the most desired size of beets for processing to developing accurate soil fertility guidelines. What was particularly impressive about his research was how he worked with specialists in breeding, pest management, and particularly in food science. Professor Shannon was an excellent mentor and shared his insights and lab facilities with new assistant professors and many others in the Department of Seed and Vegetables Sciences.

His inclusive approach to research provided growers and processors answers to many of their problems. He was a valued cooperator not only with his colleagues at Cornell, but with peers around the country. This was most evident in his work on using growth retardants on tomato transplants to increase yield and a more concentrated fruit set for mechanical harvesting. Nearly a dozen universities, the USDA, and several private companies participated in the work he led.

With more than 50 publications in his tenure at Cornell, Professor Shannon published his work across the scientific spectrum. Besides the usual horticultural journals, his work could be found in food science journals as well as top journals like Science and Nature. He was comfortable explaining his work to anyone: farmers, processors, and top scientists around the world.

After 25 years, Professor Shannon retired from Cornell in 1986 but far from slowing down, he started a whole new phase of his career. He purchased a 40-acre farm, not far from the Experiment Station, that he christened ‘Chestnut Ridge Farm.’ The farm served as a private research farm where seed companies could trial new varieties under the watchful eye of Professor Shannon. In addition, he grew asparagus and sweet corn for local markets. He also found time to work on his pet project, the restoration of the American Chestnut. He planted a hedgerow of back-crossed American-Chinese chestnut hybrids and lived to see them become remarkably productive trees. He was harvesting at least a couple of bushels of nuts each fall by the early 2000s.
The farm was a beloved pet project that kept him busy for more than 15 years in retirement. It also afforded him and his wife the ability to ‘snow-bird’ in Southern California each winter, buying a home in Riverside to be close to Nickie’s mother. In 2003, they sold the farm and moved full-time to California.

Professor Shannon was a longtime resident of Phelps, New York, and very active in many organizations. These included the Phelps Town Board, the Phelps Library Board, Little League, and as an elder in the Presbyterian Church. He and Nickie loved Phelps and its small-town ambiance. It was a great place to raise their two sons, Scott and Clayton. Professor Shannon was an avid gardener, and his home was surrounded by an acre of perennials and vegetables, all irrigated with series of pumps and pipes he personally designed and built.

Professor Shannon and his wife Nickie were also avid golfers and would play on courses around the country as they made their annual trips to California. They continued to play and enjoy the game well into their 80s. They also enjoyed travel and visited the United Kingdom where they enjoyed the gardens and of course, also played golf.

He is survived by his wife Nickie; sons Scott (Norma) of Cazenovia, New York, and Clayton, (Diane) of Arroyo Grande, California; five grandchildren Kari (Matt) of Windsor, Connecticut, Anthony (Hannah) of Hermosa Beach, California, Catherine of Manhattan Beach, California, Timothy of Manhattan Beach, California, and Niall currently with the Coast Guard; sisters-in-law Martha Martin (Clair) of San Diego, and Karen Shannon of Phoenix.

Professor Shannon lived a long and fulfilling life. He will be remembered as a loving husband and father, a dedicated professor and colleague, and a person always willing to share his time and expertise with his community.

Written by Steve Reiners and Alan G. Taylor
Peter Cedric Stein, Professor Emeritus of Physics and Nuclear Studies in the Department of Physics, died September 17, 2021, in Ithaca, New York.

Dr. Stein was a long-standing member of the Cornell community, arriving in Ithaca shortly after receiving his Ph.D. from MIT in 1956. Upon arrival, he began a postdoctoral position in the Department of Physics, where he stayed and became Professor of Physics and Nuclear Studies in 1967. He retired from the university in 2009 as Professor Emeritus.

Peter was born in Lewiston Maine on June 16, 1932, to Michael and Edna Stein. At the age of 16, he enrolled in the Massachusetts Institute of Technology (MIT). It was here that he found his enduring love for physics. He bestowed this excitement onto his students, teaching those early in their studies through Ph.D. recipients. In addition to physics courses, he taught classes on science and policy of nuclear weapons. Dr. Stein relished in the process of experimental physics, beginning with his theorist colleagues’ hypotheses, through designing, building, and
implementing experimental set-ups, and finally, running the experiment to prove the theory. He was an early adopter of using modern computers in experimental physics.

Peter was a recipient of both Fulbright and Guggenheim fellowships and spent time away from campus at synchrotrons in Rome, Italy and Hamburg, Germany. His family joined him during this time abroad. He took up residency as a research fellow at the Center for Science and International Affairs at the Kennedy School of Government at Harvard University, a visiting professor at the Program in Science and Technology for International Security at MIT, a professional staff member for the House Committee on Armed Services in Washington D.C., and a research staff member at the Institute for Defense Analyses in Alexandria, Virginia. He co-authored dozens of articles with a broad range of collaborators that focused on his interests in arms control and national security policy.

Throughout Peter’s teaching and research career, he pursued roles on many university committees. He served as a faculty trustee, one year as Vice Provost, and five years as Dean of Faculty.

Dr. Stein was deeply committed to social justice and consistently proved to be an activist and change-maker. He was heavily involved in anti-war activism during the Vietnam War era. During the 1980s, Peter instituted the anti-war convocation at Cornell, this grew into an annual event and later became the basis for a national advocacy organization, the United Campuses to Prevent Nuclear War (UCAM). Many of his efforts aimed to support and improve the life experience of those around him. Peter was a life-long member of the Tompkins County Democratic Committee and the TCDC representative to the NYS Democratic Committee. After retiring, he served first on the Town Board for the Town of Ithaca, and then for two terms on the Tompkins County Legislature. He served on several community boards, including the TCAT Board of Directors, Cayuga Trails Club, and Lakeview Cemetery.

Peter and his wife Irene marked their 65th wedding anniversary shortly before he passed. They worked together to serve the
community in which they lived for many years, each leading in the pursuit of a better world through activism and county legislation. They often opened their home to members of the local democratic party as the political and social epicenter during election season.

Peter was a loving, devoted, and involved presence in the lives of his three children, five grandchildren, and his first great-grandchild. Peter imparted his appreciation for the bucolic landscape of upstate New York through hiking and camping with his family. He embraced and followed his passion for the arts, especially opera and theater, and global cultural and religious centers, as he explored the world through travel. He held a personal pilot license and would fly his Cessna plane from Ithaca to Washington and back. Peter enjoyed writing accurate, vivid, and often humorous diary entries that would later serve as the family chronicles.

Peter was predeceased by his parents, his brother Bob Stein and his sister Jane Stein, and his daughter Margaret Deborah Stein. He is survived by his wife of 65 years Irene Wald Stein of Ithaca, his daughter Melanie Ida Stein (Howard Reid) of Ithaca, son David Orlow Stein (Suzanne Morgan) of Takoma Park, Maryland, grandchildren Anna Margaret Stein (John Hoyt) of Bethel, Connecticut, Benjamin Joseph Stein of Chattanooga, Tennessee, Michael Christoph Morganstein of Baltimore, Maryland, Martha Deborah Morganstein of Baltimore, Maryland, Emma Isabel Morganstein of Pittsburgh, Pennsylvania, and his great-granddaughter Eliza Charlotte Stein-Hoyt.

Written by Department of Physics
Professor Robert Strichartz died at age 78 on December 19, 2021, after a long illness.

Robert (Bob) Strichartz was born in New York City on October 14, 1943. After attending the Bronx School of Science, he earned his B.A. from Dartmouth College in 1963 and his Ph.D. from Princeton University in 1966, where he worked with Elias Stein. His thesis was entitled, *Multipliers on Generalized Sobolev Spaces*. He was a NATO postdoctoral fellow at Orsay from 1966-1967, and then a C.L.E. Moore Instructor at MIT from 1967 to 1969. Bob was appointed Assistant Professor of Mathematics at Cornell in 1969, Associate Professor in 1971, and Full Professor in 1977. Over the years at Cornell, he played a significant role on our Outreach Committee, Math Club Committee, and Math Majors Committee. Bob was the driving force behind our REU, he founded the Math Explorers Club that reaches local middle and high school students, and he has mentored nine Ph.D. students and many undergraduate researchers.

Bob Strichartz was an acclaimed analyst. MathSciNet has indexed
189 of his books and papers. It indicates 4,413 citations of his work. His most highly cited paper, *Restrictions of Fourier transforms to quadratic surfaces and decay of solutions of wave equations*, has been cited 611 times. In this paper, Bob proved sharp, scale-invariant $L^p$ estimates for solutions of dispersive partial differential equations (such as Schrödinger or wave equations) in terms of the $L^2$ norm of their initial data. These estimates are now called *Strichartz estimates* in his honor. MathSciNet identifies 1206 articles and books that reference them.

There is no better way to describe Bob Strichartz’s early career, than to mention his yearlong stay in Paris. His Ph.D. advisor Stein was also in Paris and delivered a legendary course on harmonic analysis at the University of Paris Sud (Orsay) captured in the equally famous book, *Singular Integrals and Differential Properties of Functions*. Bob’s thesis on spectral multipliers acting on fractional Sobolev spaces includes new descriptions of these spaces and fits perfectly with the spirit of Stein’s book.

An original thinker with broad interests, Bob made influential contributions to many subjects including classical harmonic analysis (e.g. Radon transform), its application to partial differential equations (e.g., the famous Strichartz estimates concerning solutions of the wave equation), spectral and geometric analysis (e.g., Analysis of the Laplacian on the complete Riemannian manifold and sub-Riemannian geometry), and non-commutative harmonic analysis. Later, he developed a deep interest in wavelet theory and in the analysis of self-similar measures. This last subject led him to the study of fractals as geometric and analytic objects. This became his research focus, and he had a tremendous influence on the development of the area through many deep formal and informal collaborations. He also used it successfully for over twenty years as a training ground and introduction to mathematical research for undergraduate students who explored fractal objects under his supervision.

Bob was committed to mentoring and training students. He was eager to turn elementary- and middle-school students into
mathematical thinkers. He wanted to engage our math majors with a wide-ranging short course called *Totally Awesome Mathematics*. Bob’s textbooks *The Way of Analysis* and *Differential Equations on Fractals* are renowned for their friendly style that pulls in the reader and develops intuition as well as rigorous theory. He was a fixture in his “Outdoors Office,” which in recent years was under a tree in the A.D. White Garden. Bob was also keen to nurture a friendly atmosphere in our Department, bringing us together for Cornell apples at our weekly Lunch in the Lounge, where we would talk informally about challenges facing the Department or just catch up with each other.

Bob Strichartz is survived by his wife Naomi, his son Jeremy, his daughter Miranda, two granddaughters, and a step-granddaughter. He will be remembered fondly by family, friends, and colleagues alike.

*Written by Camil Muscalu, Tara Holm (chair), and Laurent Saloff-Coste*
On May 31, 2022, Professor Chung Liang Tang, passed away at the age of 88. He was a member of the faculty of Electrical and Computer Engineering faculty for 44 years, and a recognized leader in lasers and quantum electronics.

Chung was originally from China and told a fascinating story of how his family was first driven from their home by an invading Japanese army in WW2, then again driven to escape to Taiwan when Mao-Tse Tung consolidated power in China, and finally how he arrived in San Francisco in 1950 on a boat with $100 in his pocket at age 17. He put himself through college by working any job he could find, such as cleaning trashcans at the university kitchens. This was before the days of internships.

Chung earned his B.S. from the University of Washington, M.S. from California Institute of Technology, and Ph.D. from Harvard University in 1960. At Harvard he won a fellowship for post-doctoral studies at the Technical University in Aachen, Germany.

Chung joined the electrical engineering faculty as an Associate
Professor in 1964 after being recruited by Henry Booker and George Wolga to get Cornell into the forefront of laser research, which was then in its nascent stages. At the time Chung was a principle research scientist at Raytheon.

Chung began his long and distinguished career here, and his scholarly contributions were remarkable for their quality, quantity, and breadth. Throughout his research career, he made important fundamental contributions to the theory of quantum electronics and landmark practical inventions as well. His work is still widely recognized by the international quantum electronics community. His drive for excellence clearly permeated all of his work. The quality of this work and the stature in which he was held by his peers provides clear evidence of his capabilities. Among his contributions are:

- He was the first to prove and establish the validity of the laser rate equations used to analyze dynamic behavior and stability of lasers.
- He presented the first quantum mechanical density matrix theory of the higher order of coherent Raman effect. He followed this by formulating one of the basic theories of the stimulated Brillouin effect and did some of the key experiments on this effect.
- He is responsible for measuring of the line strengths of a vast number of transitions, and the lifetimes of many excited states of rare gas ions. These are now often accepted standards in the field.
- He was the first to predict, name and observe the optical mutation effect.
- He presented the first quantum mechanical theory of the spontaneous parametric scattering process.
- He was the first to show explicitly the importance of charge transfer as the physical origin of the optical nonlinearity in III-V and II-VI compounds.
- He developed of the only high-speed electro-optical method for tuning dye and semiconductor lasers over wide spectral ranges.
• He led the development of femtosecond laser pulses. This invention shortened by two orders of magnitude the shortest time measurement capability and opens new areas to investigation, such as defining the ultimate imitations in high-speed integrated circuit devices.

His biggest impact, commercially, was the development of the femtosecond optical parametric amplifier. Versions of this laser are sold today by many companies around the world. Chung had explored optical parametric amplification for many years, developing sources that could convert the fixed output wavelength of a lasers into a tunable source. These devices were adopted by many fields, including pipeline companies that were searching for natural gas leaks in pipes using remote sensing.

Placing the nonlinear crystal inside the cavity of a femtosecond laser created a source producing femtosecond laser pulses at a dozen wavelengths simultaneously, something that researchers had only dreamed of. This remarkable device has been widely commercialized and used by chemists and scientists around the world to do pulse-probe measurements of chemical reactions. Several Nobel prizes have been based on work that used this device as their tool. The field of tunable femtosecond pulses has been transformed by this development, completely due to Chung’s remarkable insight.

Chung was awarded the Spencer T. Olin Professor of Engineering in 1985. He was elected Fellow of the National Academy of Engineering in 1986, Fellow of the Optical Society of America in 1986, Fellow of the Institute of Electrical and Electronic Engineers in 1977, and Fellow of the American Physical Society in 1975. He was an honorary Professor the Academia Sinica of the Republic of China. During his tenure at Cornell he advised and graduated over 30 Ph.D. students, many of whom today have prominent positions throughout the world.

Chung was recognized with numerous awards from the Optical Society of America, including the Charles Town Award for
advances in quantum electronics in 1966. He served on many international conferences as chair or co-chair and was a member of numerous advisory committees involved with lasers and international workshops. His advice and input were sought and valued.

Chung’s greatest source of pride and joy was his family. Chung was always affable, good humored, and self-effacing, which was amusing knowing how huge an impact he had on his field. Almost no conversation went by without some discussion of his wife Louise, or his children, Elizabeth, Gregory, and Julia. (On a personal note, the wisdom he shared with me was rarely about lasers and quantum electronics, but usually about life and family. He considered himself a lucky man to have the family he had, and often reminded me that family was the one thing that could not be replaced.) And finally, no memorial of Chung would be complete without mentioning his passion for tennis. He loved batting a tennis ball around, with another player, or even with a backstop by himself.

Chung was a true pillar of scholarship. His work had a huge impact on the research reputation of Cornell and of the School of Electrical and Computer Engineering. He enjoyed his life, and always felt lucky to have started his career at the same time as the discovery of the laser. The laser was a brand-new open book, and Chung played a major role in the subsequent discovery of many of the amazing phenomena that make lasers work.

Written by Clifford Pollock
Mike Walter was born into a DeKalb, Illinois farming family in 1945. For his entire life he embraced family, farming, the Midwest, and fun. On March 15, 1973, Mike was an Agricultural Engineering Ph.D. candidate at the University of Wisconsin-Madison and was sitting at his department chair’s dinner table. All the graduate students had been invited for dinner, but Mike was the only one with a transistor radio in his pocket and an earphone in his ear listening to Cornell play the University of Wisconsin in the NCAA men’s ice hockey semifinals. Mike’s wife, Dianne, was mortified. He was delighted when Wisconsin beat Cornell 6-5 in overtime. Two years later, in 1975, he joined the Agricultural Engineering department at Cornell University and immediately bought season tickets for Big Red men’s ice hockey in Lynah Rink and got a red and white stocking hat and scarf. He made no apologies to his beloved Midwest.

Mike jokingly told one of his brothers (Jim) that he would have stayed on the farm except for the overwhelming evidence that farming was actively trying to kill him. He was a sickly infant. His sisters (Mary Lu and Janet) had to tape splints to his arms to keep
him from scratching his eczema. He could not drink cow’s milk, so he was fed some sort of soybean mush instead. He was also allergic to eggs and had terrible hay fever. But, according to Mary Lu, he was irresistible because his smile was infectious; a trait that would serve him well throughout his life. He and his brothers spent endless unsmiling days “walking” the soybeans to weed out the “smartweed” and “velvets.” It literally took all morning to walk from one end of the field and back; Mike had to wear a mask, so nobody knows if he was smiling. Of course, with all the farm tasks there was no time for organized sports. A fan of nearby Sycamore High School basketball was pleased that Mike did not play for DeKalb because “Mike was a very talented basketball player.” Mike loved both farming and basketball throughout his life. His mother, Lucile, always said she knew when Mike was home because she could hear the dribbling in the driveway. He shot endless baskets with his daughters, Robin and Heather, every night at his home in Lansing, New York. But he also loved farming and he once told his wife during his graduate student years that he longed to get out of the office and just pick one weed. I do not know if his wife doubted this longing for weeding, but she did doubt his egg allergy and, long-story-short, after eating a brownie containing an egg it was clear he was still allergic.

Somehow, Mike wove his way through allergies and faculty faux pas to an agricultural engineering position at Cornell University. Mike came to Cornell on the heels of hurricane Agnes, which devastated much of the region. One of his early graduate students (P. Robillard) actively researched ways to reduce flood risks in the aftermath of Agnes and noted that Mike looked for novel, non-brick-and-mortar solutions. He was instrumental in formally establishing the Soil and Water Lab (SWL) and endorsed luminary researchers like Tammo Steenhuis and Jean-Yves Parlange as well as outstanding extension faculty like Larry Geohring. During his career, the SWL produced more than 1000 peer-reviewed research papers and at least 10 times that many through its legacy of SWL students. The SWL played pivotal roles in securing the water quality of the New York City watersheds and explaining the physics for pesticide risks to the Long Island aquifer. Dr. Parlange identified
over a dozen specific areas of basic research upon which he, Tammo, and Mike collaborated that underpinned these seminal water quality protection accomplishments. The enormous impacts of the SWL on basic and applied environmental are internationally recognized and the lab continues to be highly productive and influential.

From the early 1980s through the early 1990s, Mike’s focus turned to international water resources, especially irrigation. He deployed graduate students across the world from the Philippines to Niger to Honduras to Nepal and beyond. For several years he was with the USAID in India and surrounding countries, working on irrigation with agricultural scientists and engineers from the Indian Council for Agricultural Research, especially in Haryana at the Central Soil and Water Conservation Research and with the Training Institute and the Central Soil Salinity Research Institute. His family relocated to New Delhi, India for two years. The experience inspired his daughter’s (Tanya’s) family to pursue their own overseas opportunities in Asia and South America. Mike and Dianne also adopted a daughter, Mahima, from Mother Theresa’s orphanage. Several of Mike’s graduate students specifically mentioned their appreciation that he would take substantial time to visit them, their families (sometimes in very remote locations), spend time with their in-country collaborators (mostly farmers), and simply be present with them for a little while. I think Mike’s enthusiasm for listening to others was perhaps his most formidable skill. One of his former graduate students called it Mike’s “human angle,” asking questions about people’s immediate life and how they made decisions and, mostly, listening to their answers.

In 1994, Mike was appointed the department chair of Agricultural and Biological Engineering, formerly Agricultural Engineering. He would continue encouraging the department’s evolution to Biological and Environmental Engineering (BEE). Mike embraced the emphasis on biology, a fundamental underpinning science. In particular, he was intimately aware of the enormous power of biosensors because his mother regularly used Coony, the family pet racoon, to find him and his brother (Bill) when they were hiding in
the barn. Mike built a formidable faculty that would be unrecognizable to any Agricultural Engineering departments of previous decades and helped lead the transformation of this discipline into the 21st century. Under his leadership biomolecular engineers collaborated with environmental engineers to, for example, trace septic system drainage using synthetic DNA tracers. Mike continued to be the BEE department chair for most of the rest of his career, expanding the discipline to encompass exemplary leadership, expertise, and synergies ranging from molecular biology to climate change. He also expanded the diversity of faculty of the department and was known as a generous and enthusiastic mentor for young professors, providing encouragement to both men and women from diverse backgrounds. During and following Mike’s chairmanship, the BEE department was consistently ranked among the top five departments of its kind in the U.S. and one of the highest-ranked engineering departments at Cornell.

Mike was successful and made numerous tangible positive impacts in environmental and biological engineering, especially in water resources. But he is also memorable as a person beyond his professional achievements. I Googled “what makes a person memorable” and the most recurring attributes were: “Natural Giver,” “Good Sense of Humor and Laughing at Yourself,” “Passion,” and “Kindness.” For those who knew Mike personally, they know that he encompassed these attributes “in-spades.” But kindness, in particular, stands-out. In the 2016, nomination letter for the CALS Outstanding Service Award the writers state “Mike’s greatest strength is his humanity … kindness, charity, compassion, sympathy, mercy, [and] benevolence.” He formally received this award – as well as too many others to enumerate here. He valued everybody from janitors to luminaries. Mike knew every custodian’s, staff person’s, and student’s name. For goodness sakes, he also knew the names of the dogs on the farms where he worked. Several of Mike’s former students noted that, while balancing all his obligations, he was always grounded in his mission to teach, inspire and support students, mostly notably, within the context of their own specific challenges and aspirations. Indeed, many students shared a proverbial Pearl of Wisdom that Mike gave them and no two were
the same. Again, it was his “human angle” for which he is most remembered. Essentially everybody I contacted for their thoughts about Mike and his legacy specifically noted his kindness and many observed the infectious smile that his sisters saw when he was an infant. In short, Mike’s was a life well-lived. Of course, Mike would ask, “what the Sam Hill does that even mean?”

Written by Todd Walter and John March