high schools had greatly expanded in scope. Her efforts subsequently led to NSF-supported programs at several US universities to send teams of physicists, teachers, and undergraduates to high schools in South Africa to help initiate programs that would enhance hands-on physics training. The programs are now sustained through the efforts of local education ministries and scientists.

In 2000–02 Julia established and directed a Research Experiences for Undergraduates program at Southern Illinois University in Edwardsville as a satellite of the Pittsburgh program. In 2002 she initiated QuarkNet activities, partly through her research program at the University of Pittsburgh and partly through a cosmic-ray program based at the University of Missouri–St. Louis. Specifically, as part of this nationwide outreach program, Julia worked with high-school teachers and students in the St. Louis area to build cosmic-ray detectors that would be placed in high schools and to organize the data collection so that the data obtained from different sites could be combined. She was appointed adjunct professor of physics at Missouri in 2003.

Julia was active in the American Physical Society, where she served on a number of committees that addressed issues concerning the participation of both women and minorities in physics. She took a special interest in African American students in her own programs and was in regular contact with the National Society of Black Physicists. She frequently gave talks on both her physics research and outreach activities at the NSBP's annual meetings.

Julia was a dedicated scientist and teacher whose work was interrupted at the height of her career. She is missed by a large number of students, colleagues, and collaborators from around the world. She is remembered as a tireless and tenacious physicist, a compassionate and caring individual, and, above all, a champion for the underprivileged.

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Ming Xie

Ming Xie, a world-renowned theorist in free-electron lasers (FELs), died in Wuhan in his homeland of China on 23 August 2004 after a year-long battle with cancer.

Born in Beijing on 10 May 1959, Ming obtained his BS in physics from Wuhan University in 1982. For his graduate education, he came to the US as one of the early participants in the China–US Physics Examination and Application Program. He obtained his MS (1984) and PhD (1989), both in physics, from Stanford University. His doctoral thesis work on the theory of optical guiding in FELs was supervised by John Madey.

After receiving his PhD, Ming went to Lawrence Berkeley National Laboratory (LBNL) as a postdoc in the center for beam physics, where he worked primarily with one of us (Kim). Shortly thereafter, he was named a permanent staff scientist, a position he held until his death. He became a guest professor at Beijing University in 1998.

Beginning with his dissertation work, Ming pursued a lifelong interest in the theory of FELs, to which he made important contributions that brought him wide recognition. One of the early topics Ming studied at Berkeley was the performance and optimization of hole-coupled resonators in an FEL oscillator. He developed an accurate computational method for the hole-coupling efficiency, which became the basis of a highly stable, high-power IR FEL design proposed for the Chemical Dynamics Research Facility at LBNL—but the research facility was never built. The depth to which Ming pursued that research and the thoroughness of his investigations became the hallmarks of his subsequent work.

Armed with the numerical techniques he developed for optical resonator modes, Ming then attacked and eventually succeeded in solving the formidable integro-differential equation for high-gain FELs, including the effects of imperfect electron-beam quality. Again with his characteristic thoroughness, Ming developed a many-parameter fitting formula for high-gain FEL performance based on numerical evaluation of his exact solution and benchmarking to simulation code results. The fitting formula has been in wide use in the global FEL community as a numerical tool for rapid parameter optimization. That work and other investigations made Ming a significant early contributor to the physics and design of so-called fourth-generation light sources such as the Linac Coherent Light Source x-ray laser project at SLAC.

Ming Xie

Ming's FEL work led him naturally to contribute to other areas such as laser acceleration theory and its connection with electromagnetic radiation; gamma–gamma interactions; physics of the interaction point of future high-energy colliders; and charged-particle cooling for future muon colliders. Despite the brevity of his career, he wrote or coauthored some 70 papers in refereed journals and conference proceedings, and contributed to the design reports for three new accelerators.

In recognition of his work, Ming was chosen to take on major tasks at important meetings. He was either a co-organizer or session chairman of the International Free-Electron Laser Conference from 1996 until his death.

Ming's interactions with his colleagues were friendly and sometimes intense, but were guided by his independent thinking, deep technical knowledge, and scientific integrity. One was often struck by the innocence of his questions at seminars and by his tenacious pursuit of scientific truth, which occasionally led to unintended confrontations with colleagues near and far. Although he became a US citizen, Ming remained proud of China's success in evolving into an industrial and scientifically powerful country. His early death is a loss to all of us in the community.

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