Joseph Thomas Rogers

October 22, 1957 — May 25, 2004

Joe was born in Chicago and lived most of his childhood years in Glen Ellyn. His parents, Joseph and Gertrude, were artists trained at the Art Institute of Chicago. He attended SUNY at Stony Brook where he graduated with a B.S. degree in Physics in 1980. At Stony Brook, he received the Outstanding Student Award, also in 1980. After graduating, he worked as a Research Engineer for a laser manufacturer for two years. Joe then entered the graduate program in physics at the University of Rochester, receiving the Ph.D. degree in 1987. His thesis topic was entitled "Limits on the Electromagnetic Coupling and Density of Galactic Axions". In this work, Joe showed great versatility in both technology and physics, as well as very broad scientific interests, although topics close to astrophysics and cosmology remained close to his heart throughout his career.

In 1987, Joe worked as a Visiting Scientist at Istituto di Fisica dello Spazio Interplanetario, returning to Rochester as a Research Associate stationed at Brookhaven National Lab (BNL), where he started working on an experiment to measure the birefringence of the vacuum using high field superconducting magnets and optical techniques. While at BNL, his outstanding talent did not go unnoticed and he received an offer to take a position with the National Synchrotron Light Source. Although unfamiliar with this kind of research, Joe's experience with his thesis at Fermi National Accelerator Lab enabled him to begin making important contributions to the operation of two storage ring accelerators at BNL. His BNL colleagues had this to say about him:

> *"He was an easy person to like—cheerful, friendly, warm and gentle. Those with whom he worked at the time recall that he had a gift for finding simple solutions to complex problems. Also he was able to communicate his results in an elegant manner, quickly getting to the heart of the matter. Joe enjoyed his work, and that, combined with his quick intellect, led to very thorough and superbly performing systems that remain in use today".*

When an Assistant Professorship in accelerator or particle physics came open at Cornell in 1992, Joe easily got the nod and began his productive Cornell career where he made important contributions to teaching, service and research. In teaching, Joe was active in developing Peer Instruction using new technologies. He was very keen on student interaction and "active learning". Joe was Director of Undergraduate Studies in the Physics Department from 1998 to 2001. Of his teaching, here is a typical quote from one of his student evaluations:

> *"From the first few days of class, it was very apparent that Professor Rogers was a genuinely nice man. There was nothing arrogant or presuming in his demeanor, and he always seemed happy to be sharing his knowledge of physics with the class… This class was the best physics class I've had at Cornell".*

In other service activities, he served on Graduate Admissions, Bethe Prize Committee, co-coordinator of Research Experience for Undergraduates, Faculty Search Committee, Colloquium Committee and Research Associate Search Committee. He also served in the Teaching Assistant Training Workshop of 1995 as well as several activities in the college and university.

When Joe arrived at Cornell in 1992, he joined the CESR operations group. At about that same time, the CESR group had undertaken the challenge of circulating trains of closely spaced bunches of electrons and positrons only to discover that multibunch instabilities limited the total beam current. Joe spearheaded the effort to develop a broadband feedback system to control the instabilities. He designed the digital signal processor and a stripline kicker that was capable of delivering distinct impulses to bunches as few as 10 billionths of a second apart. The digital processing electronics has evolved in the past decade, but we continue to depend on Joe's kicker to stabilize the multi-bunch beams.

Joe had an unusual ability to find simple explanations for apparently complex phenomena. In the mid 1980s, a collective instability was observed in the Cornell storage ring. The current dependence of the instability was so unusual and counterintuitive that it was designated the "anomalous" antidamping. We eventually learned to control the effect but its origin remained mysterious. When Joe came to Cornell, he reviewed the data that had been accumulated over the years. He made a few well-conceived measurements of his own and then proposed a wonderfully simple model of a photoelectron trapping mechanism. His calculations predicted precisely what we had long observed.

Joe applied his deep intuition for beam dynamics and his ability to translate physics of complex systems into computer models, to the study of the beam-beam interaction in electron-positron colliders. He worked with students to develop a so-called strong-strong simulation. His innovative strategy for treating the collisions yielded a calculation that relied on few approximations but could be completed relatively quickly. And he put a cluster of two dozen high-speed computers to work investigating the nature of the interaction.

Recognized as an international expert in the field of electron positron colliders, Joe was invited to give a review talk at the 2001 Particle Accelerator Conference entitled "Beam Dynamics in High Luminosity e+e- Factories." But Joe's interests in accelerator physics research extended beyond the Cornell Electron Storage Ring to the wider programs of the international community of elementary particle physics.

In recent years, the world community of particle physics has been planning for the next frontier facility, an electron–positron collider capable of investigating important questions about energy, matter, space and time. Joe

played an important leadership role in both the joint international efforts and in the American regional effort. In 2001, an international coordinating group commissioned a review of the worldwide state of R&D and design concepts on which to base a selection of the technology to be carried through to final engineering. Joe was a key member of that review, acting as leader of the review team for a major sub-system of the accelerator complex. In the American regional efforts, Joe has been a leader in the process of engaging universities in contributing to the R&D and planning for the future facility, taking on important coordination activities in creating a multi-university proposal to the National Science Foundation.

In addition to these community service activities, Joe has, himself, made significant contributions to the R&D and concept design activities. Together with his students and collaborators at Cornell, the University of Illinois, and Fermilab, he developed innovative designs for the injector sub-system of the collider. These ideas will continue to be developed and will play a crucial role in simplifying the design of a key element of the international linear collider.

Joe is survived by his wife, Rene; sons, David and Michael; his father, Joseph W.; and a brother, Steven. We have lost a dear friend and colleague and a major contributor to world science.

Gerald F. Dugan, Sam Krinsky, Adrian Melissinos, David Rubin, Maury Tigner