

In memory of James McEwan Paterson

Contributed by Ewan's friends and collaborators

December 16, 2022



James McEwan Paterson, 1937–2022.

SLAC Professor Emeritus James McEwan Paterson, treasured colleague, accelerator physicist and senior manager, died on Sept. 20, 2022. He is survived by his wife of 60 years, Mandi.

Ewan, as he was affectionately known to all, was born in Glasgow, Scotland in 1937. He studied physics at Glasgow University, completing his bachelor of science in 1959 and his PhD in 1962. After a one-year postdoc at his alma mater, Ewan worked in the Harvard University physics department from 1963 until he joined SLAC in 1972. Upon his retirement in 2010, Ewan transitioned to emeritus professor.

Ewan joined Harvard to work on the Cambridge Electron Accelerator (CEA), a Harvard-MIT 6-GeV electron synchrotron facility housed on the Harvard campus. He soon became a major contributor to the facility and its improvement program, as evidenced by his presentation, "Improvements in the Research Capability of the CEA," at the 1965 International Conference on High-Energy Accelerators. By 1967 his energies had transitioned to the team working under Gus Voss on a proposal to convert the CEA to a 3-GeV colliding beam facility with an anticipated luminosity of $10^{31} \text{ cm}^{-2}\text{sec}^{-1}$. Herman Winick, professor emeritus at SLAC, who at that time was also a member of the Voss team, recalls: "Accomplishing the above involved overcoming a large array of technical problems and instabilities which the team faced over several years. Ewan contributed to solving all of these problems. When Richter realized that he needed more help in completing the design and commissioning of SPEAR, he reached out to Paterson and hired him." And again, testament to the breadth of his contributions, Ewan authored the 1971 IEEE Transactions on Nuclear Science article "Performance of the CEA Colliding Beam Facility."

Ewan's many contributions were central to the successful design, commissioning and operation of SPEAR and, as his longtime SLAC colleague and friend, Greg Loew said of him: "I met Ewan and his wife Mandi shortly after they moved to California to join the SPEAR project, then under construction. Ewan was very closely involved in the turn on of SPEAR, and he worked very well with Burt Richter who greatly appreciated him. Ewan was a very good accelerator physicist, and he had an intuitive feeling for machines. It was always a pleasure to work with him because he was invariably kind and considerate. He and Mandi had a very close relationship."

SPEAR and its ground-breaking Mark I, a 4π magnetic detector capable of seeing nearly all particles emerging from a collision, proved to be one of the most discovery-dense high energy facilities ever run. Leading among the discoveries were the charmed quark and the tau lepton, both of which were crucial to the acceptance of the Standard Model of particle physics and both of which were accorded the Nobel Prize for Burton Richter and Martin Perl, respectively. Ewan was a co-author, not only on the two publications that heralded those discoveries but on all the Mark I publications. When the Stanford Synchrotron Radiation Project (SSRP) light program began in 1974 at SPEAR, a mechanism was needed to steer the extracted neutral photon beam to the scattering targets. Ewan designed a simple, yet effective, electron-beam orbit control circuit that allowed for precise and stable real-time positioning of the photon beam. And so began Ewan's prolific accelerator physics career at SLAC, which was followed by over 40 years of contributions to the design, construction and operation of nearly every one of SLAC, SSRP and SSRL's accelerator-based projects. He did this even during the many years when he had onerous management responsibilities.

The success of SPEAR spawned the PEP colliding beam facility. With eight times the collision energy, and a suite of four 4π magnetic detectors, the project was considerably larger and more complex than had been SPEAR. From 1978-81, Ewan served under John Rees, yet another transfer to the SLAC faculty from the Voss group at CEA, as assistant director of the PEP Project during the construction, commissioning and initial operating phases. From 1981-83, Ewan was the Storage Ring Operations head for the PEP Division. In 1989, as part of the IEEE Particle Accelerator Conference, Ewan presented "PEP as a Synchrotron Radiation Source: Status and Review" and was a co-author on the submission "An Asymmetric B Meson Factory at PEP," the initial LBL-led proposal presented by Al Garren. Ewan was a co-author of the 1990 SLAC-PUB 5180 "Tau-Charm Factory Design Report," which was the basis of the proposal for construction at SLAC. Ewan was also a co-author on the initial proposal for the Linac Coherent Light Source (LCLS), "A 2-nm - 4-nm linac coherent light source using the SLAC linac," presented at the 1993 IEEE PAC conference. The Technical Division, under Ewan's leadership, made major contributions to the subsequent design and construction of LCLS.

Ewan accomplished all of the above while, at the same time, successively shouldering more demanding management roles within the Technical Division: as head of Accelerator Theory and Special Projects (1983-89), assistant director and head of Accelerator Systems (1991-93), and, upon the retirement of Kaye Lathrop, associate director and head of Accelerator Systems (1994-2002).

From 1984 until it was shut down in 1999, Ewan was involved in all aspects of the Stanford Linear Collider (SLC) machine, commencing with his 1984 technical note “SLC Nomenclature for Beamline Components” and the nine-author SLAC-SLC report “SLC Performance in 1991.” As indicated below, Ewan leveraged most effectively his accumulated knowledge from the SLC into the Next Linear Collider and International Linear Collider projects.

Following the successful operation of the SLC, SLAC embarked on the Next Linear Collider (NLC) project, the design of a future linear collider using X-band (warm) RF technology in the main linacs. This project was accompanied by the NLC Test Accelerator, a facility for testing the NLC concepts, components and subsystems. Ewan was involved in all aspects of the NLC and the test accelerator. Greg Loew commented: “When in the early 1990s we began active collaboration with KEK in Tsukuba, Ewan and I often traveled there together and had great fun.” By the early 2000s, the NLC had expanded into the U.S. NLC project, involving FermiLab, Lawrence Berkeley and Lawrence Livermore national laboratories, and Ewan served as the SLAC representative on the project Interlab Coordination Committee.

In August 2004, the International Technology Recommendation Panel recommended adopting superconducting RF technology for the linear collider main linacs and the three existing linear collider projects – the Next Linear Collider (NLC), the Global Linear Collider (GLC) and TeV Energy Superconducting Linear Accelerator (TESLA) – joined their efforts into one single project, the International Linear Collider. Professor Barry Barish was appointed the director of the Global Design Effort (GDE), a multi-national team tasked with designing a global facility. After an immense effort, the GDE published their design report in 2013. Ewan served in many leadership capacities on the GDE including as its integration scientist and as a member of the executive committee. It is hard to capture how broad and important Ewan’s GDE contributions were, and perhaps they are best represented by the words of Barry Barish: “The Global Design Effort for the International Linear Collider was a special adventure. A group of very talented accelerator physicists were brought together from around the world, due to their varied expertise on particle accelerators. This was a brilliant group, but also one of different ideas, approaches, styles and personalities. Ewan was at the very heart of making this group come together to create a coherent linear collider design. Ewan had the unique set of talents, a long history and great knowledge of accelerator physics, the flexibility to jump in whatever was the problem of the day, and the personality to work with anyone. Finally, speaking for all of us, we loved Ewan and miss him terribly.”

Ewan was a classmate at Glasgow University of David Leith, professor emeritus and former research director and leader of Group B at SLAC who died in 2020. Mandi and Ewan shared a very close, lifelong friendship with David and his wife Doreen from the time they all met during their university years in Glasgow.

Jonathan Dorfman said of his colleague of many years: “Ewan Paterson was most beloved and highly respected by his colleagues and coworkers at SLAC and by the international high energy physics and synchrotron radiation fraternities with whom he had broad scientific connections and long-standing friendships. He will be sorely missed by all.”

See more [biographical information](#) from the Archives, History and Records office.



The SPEAR control room (l-r): Rudy Larsen, George Trilling, Ewan, David Fryberger and Burton Richter.