



Tributes to Dr. Hans Pfeiffer from the eBeam Initiative Community – Spring 2023

“Hans Pfeiffer was not only an important consultant to the Variable Shaped Beam Lithography Group in Jena, Germany but also a close friend and fatherly adviser. The notification of his death triggered a lot of memories and emotions among our former and current colleagues. Shortly after the fall of the iron curtain, Hans and his colleagues from IBM were invited to Jena to talk about the astonishing independent and parallel developments of Variable Shaped E-Beam-Technology in the East and the West since the late nineteen sixties. Born in Germany, Hans was predestined to support these complex discussions and did this with great openness and expertise. With his broad experience and expertise, he continued to provide advice for several E-Beam-developments worldwide. One could say he was acting as, (taking the liberty of this physical metaphor), a "binding electron" in the "molecule" of the E-Beam-community. Over the years, Hans became a constant companion and a real friend for us. He gave us excellent advice and valuable support not only in technical areas but also in human matters. Hans-Joachim Döring, former Senior Scientist at Vistec, spoke of many pleasant, inspiring, and creative sessions with Hans over the years. He found him open minded, honest and an extremely likeable contemporary.

With Hans Pfeiffer’s passing, one of the important pioneers in e-beam lithography is gone, which leaves us with great sadness. We will miss him dearly.” – Ines Stolberg & Matthias Slodowski on behalf of Vistec Electron Beam GmbH

“I first met Hans Pfeiffer in the mid 1970’s while I was a young engineer just starting my career at Texas Instruments. There was a very cooperative relationship between the two eBeam lithography programs at IBM and TI. I had a chance to have an extended private talk with Hans at the EIPBT Conference in Boston a few years later. From that day forward Hans became a mentor, teacher, colleague, and dear friend. Years later when Hans was elevated to IBM Fellow, he reached out to bring me into his eBeam group which began an 11-year period of a very close relationship of mentoring and friendship. Hans could be very stern but was always fair in his guidance. Christmas at the Pfeiffer household was always a joyous occasion which had to include Hans’ favorite “champagne” Henkell (of course it was from Germany). He loved to pop the cork out over the back deck of his Ridgefield home into the lake below. He and his very gracious wife Franziska were always the warmest of hosts. After his retirement from IBM, Hans returned to the place he loved, Carmel CA. Since I lived less than 2 hours away my wife and I often visited to continue a lasting relationship. Hans’ many contributions to the advancement of eBeam Lithography are too numerous for a short tribute but Hans the man is also just as accomplished and will be remembered with the warmest of emotions and he will be greatly missed. Farewell Hans” – Paul Petric

“Hans was like my dad to me. He both reminded me a lot of my dad and also provided guidance and emotional support to me in exactly the same way my dad did. Sure, my dad was Japanese, and Hans was German, but to me they even looked a like, had very similar mannerisms both physically and philosophically, and had really warm handshakes that communicated both who they were and the love they had for you and all of nature. They were both physicists and how they saw the world reflected that so beautifully. I often thought that what Hans was saying to me was exactly what my dad would say if my dad was in our field. I miss him.” – Aki Fujimura, CEO of D2S, Inc.

"I had the chance to experience Hans as a great mentor, teacher and educator in the field of E-Beam Lithography. His extensive knowledge and expertise will carry on with his many students and his followers within the E-Beam community. Personally, I appreciated his friendly and honest manner and his openness for discussion of everyday challenges. His name will always be linked with E-Beam technology. Farewell Hans – we will miss you!" - Christoph Hohle, Fraunhofer IPMS, Dresden (Germany)

"I worked with Hans from 1983-1999 at the IBM facility in East Fishkill New York. We developed ebeam technology for manufacturing of the logic chips which formed the heart of the IBM computers. Using a technique which we called 'personalization', we used ebeam direct write for wiring and via levels, the so-called Back End of the Line. This enabled us to try new chip designs with quick turnaround time in manufacturing. Hans was a great leader and achieved the rank of IBM Fellow. On a personal level I will always remember his constant devotion to his associates across our industry. He is greatly missed!" - Timothy R. Groves, Professor (Emeritus), University at Albany, State University of New York (US)

"I first met Hans in 1969 soon after he was hired by IBM. It was clear that he was well versed in electron optics, and the development of shaped beam electron optical systems defined his professional career. In addition, he was charismatic with great power of persuasion. He and I didn't always agree on technical matters, but we remained very good friends. I am sorry he left us so soon." – Fabian R. Pease, Professor (Emeritus), Stanford University (US)

"Hans Pfeiffer has put his mark on electron beam applications for semiconductor technology for nearly 50 years. The shaped beam technology pioneered by his group led to lithography tools suitable for direct write electron beam lithography applications in semiconductor manufacturing and influenced today's mask making equipment. Having received his training in electron optics at the Boersch group at Berlin Technical University, Hans was early on aware of the detrimental effects of electron-electron interactions on resolution and edge acuity of electron beams and led the drive to minimize it by establishing proper design rules. In the working environment he always put emphasis on a commitment to scientific and engineering rigor. He will be remembered as a fair colleague, firm in his technical beliefs, and a friendly and cosmopolitan gentleman in private." – Dieter Kern, Professor, Eberhard Karls University Tuebingen (Germany)

"Hans Pfeiffer was a close colleague and friend of mine since we met in IBM fifty years ago. He personally created the original concepts for producing shaped electron beams that allowed electron beam lithography to be fast enough to be economical in customizing gate-array chips. He then went on to lead IBM's initiative to be first to use electron beam lithography in manufacturing. This was of great importance because it eliminated the need to make masks and allowed new chip designs to be produced in days rather than months, a huge advantage that accelerated the design of computers. The lead this gave IBM was a key ingredient in enabling the company to dominate the large computer market in the 1970s and 1980s. The IBM electron beam team in East Fishkill was the largest in the world, and through the use of increasingly sophisticated methods for dynamically changing the shape of the beam, it managed to keep electron beam lithography cost-competitive through to the 1990s. To recognise his creativity and leadership of this team, Hans became an IBM Fellow in 1985, the company's pre-eminent technical distinction, that was granted in recognition of outstanding and sustained technical achievements and leadership. Only a handful of IBM's 40 -50 thousand engineers, scientists and mathematicians were so honored each year. Hans will be greatly missed as a creative driving force and as a lively and entertaining friend and colleague." - Alec Broers

"Hans left us. What a sad story... he left an empty seat in our scientific community. His kindness, his presence. Fortunately, through his papers, he will be always with us. Thanks for all, Hans." – Laurent Pain, CEA – Leti (France)

"I had the privilege of working with Hans at IBM for nearly 15 years. While reflecting on that period my first thought was of the many technical successes of the group. Beyond his technical acumen, Hans was a consummate team builder. He brought many people together in East Fishkill to develop multiple generations of electron beam tools over a career spanning decades. The people who joined the Pfeiffer group tended to stay for years, sometimes decades, forming lasting friendships with their e-beam colleagues. In a company whose initials were often seen as standing for "I've Been Moved", the e-beam group was remarkable in its longevity and stability with Hans at its helm. As a Fellow, Hans had reached the pinnacle of technical achievement at IBM. Had he chosen to do so, he could have easily climbed the corporate executive ladder, but he elected to stay technically involved throughout his career, staying at the helm of the e-beam group until his retirement. Hans's influence on e-beam technology extended around the globe. He was active in the EIPBN community, chairing the 1988 conference and participated on the advisory board for many years. During the 1990's he championed PREVAIL, a high throughput e-beam lithography program developed jointly between IBM and Nikon. He organized a series of conferences dedicated to the subject, centrally located in the Hawaiian Islands. By the time I joined the Pfeiffer group in the late 80's the use of shaped beam technology, pioneered by Hans, was already in its 3rd generation with over 30 systems in use at IBM. The technology is still in wide use today in mask shops around the world. His insights, dedication and enthusiasm for all things e-beam will be long remembered. He will be missed. – John Hartley, Fellow, NuFlare Technology America, Inc. (US)