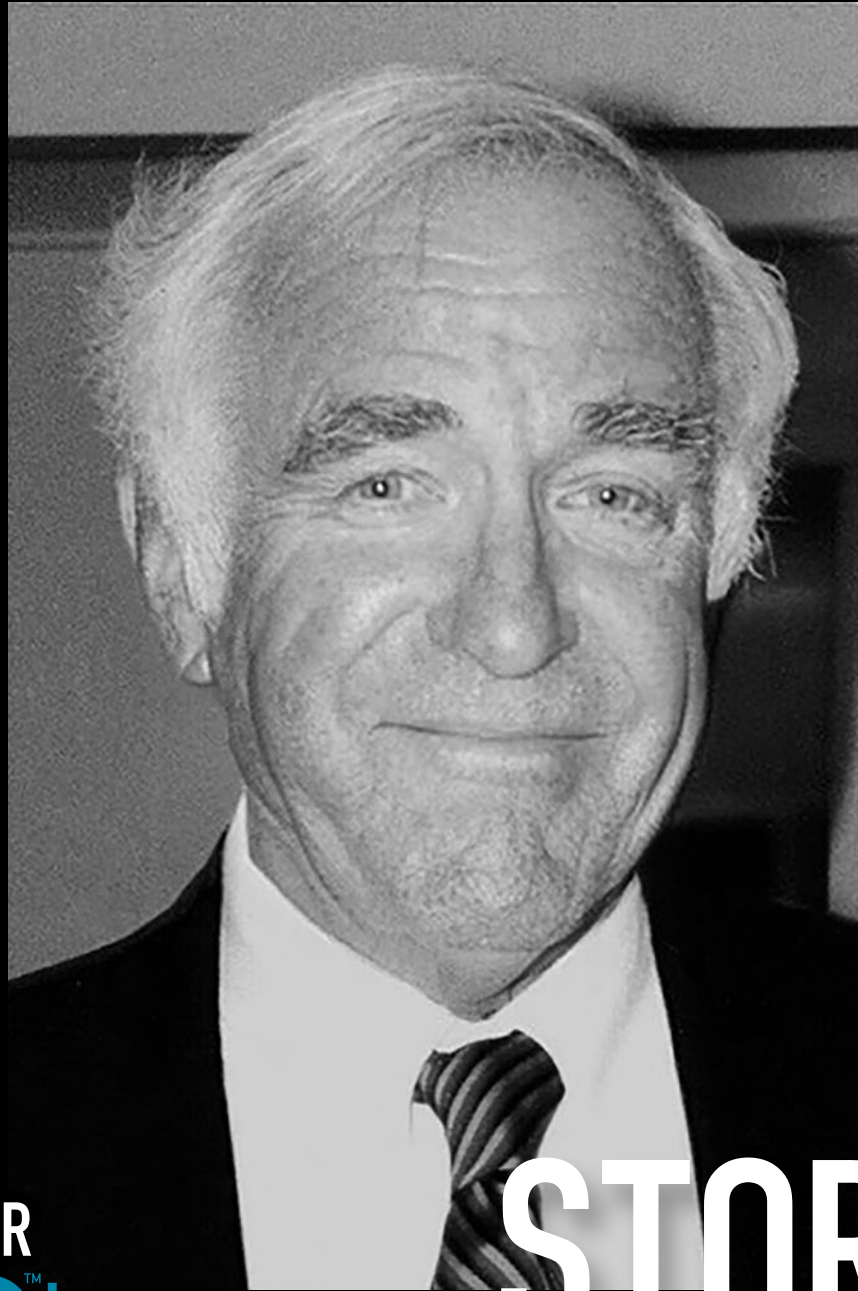


Peter H. Rose

Gloucester/Rockport Innovator

by Jerry Ackerman and Matthew Beach



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FOREWORD

In one sense, this story is about Peter Rose, whose ideas and vision led to the 1971 formation of Extrion Corporation (later known as Varian and now a part of Applied Materials Inc.). Extrion's products and those that followed helped bring a worldwide revolution now known as the Digital Age. At the same time, this story is a tribute to the hundreds of Gloucester residents and others whose work in making this company a global success brought the city's economy squarely into the electronic age as its traditional fishing industry was declining. It is to them that this story is dedicated.

Peter H. Rose

Gloucester/Rockport Innovator

BY JERRY ACKERMAN AND MATTHEW BEACH

In the early 1970s, the very idea of affordable, high-speed computer chips was just that--an idea. The earliest computer chips were made with a cumbersome chemical process so unreliable that seven out of every ten chips had to be thrown away. Costs were exorbitant. The first consumer pocket calculators sold for \$119.95 in specialty stores. Similar devices today cost under five dollars. Then, along came Peter H. Rose, an innovator seeking a home for a revolutionary technology that made mass production not only feasible but affordable. The process, called ion implantation, has since produced billions of applications and devices ranging from smartphones, DVRs, and coffeemakers to space telescopes and making cryptocurrency.

Who was Peter Rose?

Soft-spoken, scholarly, and genial, Rose emigrated from England in the 1960s, while in his mid-30s, already holding a doctoral degree in nuclear physics, to further study at MIT. Those studies completed, and newly married to Margaret, he landed a job running a research laboratory at a Boston area high-tech company that built advanced particle accelerators, sometimes nicknamed "atom smashers." There, he recognized this technology had other applications that would win national and world recognition by making computer chips affordable.

Over the years, Rose founded, directed, or played a key role in many local North Shore companies dedicated to this technology. But the first was Extrion Corp., founded in 1971, and from its earliest years, located in Gloucester's then-new Blackburn Industrial Park. Known later as Varian Semiconductor and finally, today, a division of Applied Materials Inc., Extrion was the first in the parade of companies that Rose got off the ground, including another North Shore giant, Axcelis Technologies, located in Beverly.

Extrion and the companies that followed didn't make actual computer chips. They created machines that are critical to mass-producing the chips. The import of Rose's technical innova-

tions in making the chips affordable and ubiquitous cannot be overstated. Look no further than your smartphone to understand this. Fifty years ago, such a device at an affordable price was impossible. Today, smartphones with enough computing power to send rockets to the moon are part of daily life for almost nine-tenths of the world's population.

Throughout the computer chip industry, the machines introduced by Rose and the colleagues who worked with him became fabled and praised for their durability and low maintenance needs. They became almost as essential to mass production as heat is to cooking food. As Robert Doering, a Texas Instruments, Inc. researcher, put it in an interview with the *Boston Globe*, "Without them, we (the industry) would have had to struggle, no doubt about it."

Why Gloucester?

One who worked alongside Rose from the start was Andrew Wittkower of Rockport. Recalling the early years, when he was asked why a fishing port like Gloucester was chosen as a site for a technical innovation company, Wittkower quickly replied, "It is a nice place to live." But there was much more. A profile of Rose in the *Boston Globe* in 2002 by Gloucesterite Jerry Ackerman found the root cause was that Rose had found his first major investors in Gloucester, the founders of Gloucester Engineering, Inc., which made machinery for manufacturing plastics. Along with money, Gloucester Engineering had extra space in its own building where Extrion could set up shop.

The fact that this space was available at all was due to a meshing of interests a few years earlier that led to Gloucester's city fathers opening the industrial park at Blackburn Circle. Gloucester's economic outlook was uncertain. The fishing boats and seafood processors that lined Gloucester's waterfront were facing a fragile future. Young and vigorous, Gloucester Engineering was the park's first large tenant and successful in its own business, had extra cash to invest. Rose explained: "In 1971, it was one of those times when technology was the sort of thing to invest in."

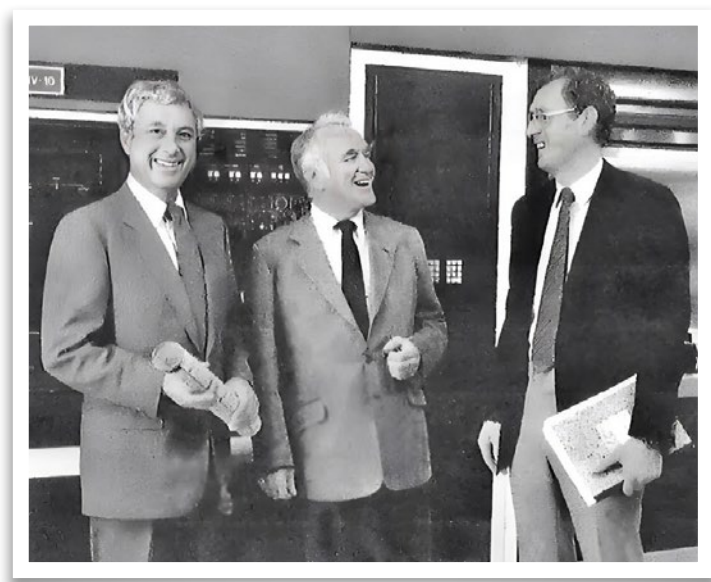
Rose was committed to recruiting workers from the community, offering training and career possibilities beyond the fishing industry. One example of how Extrion's presence was known as a possible local career choice involves an often-repeated story: A young man named Eddie

Warnock walked in off the street and offered to sweep floors, willing to work himself up in the company. Warnock was hired on the spot and eventually became the head of electrical assembly for the budding corporation. Stories like this are not uncommon and speak to Rose's commitment to local residents.

Accolades

Throughout his career, Rose received a stream of honors and accolades for his pioneering prowess and entrepreneurship. He wrote and published more than 50 technical journal articles and papers. In 1996, President Clinton awarded him the National Medal of Technology and Innovation for his "vision and leadership in the development and commercialization of ion implantation products that make possible the manufacture of modern semiconductors and for his success in establishing and maintaining U.S. global leadership in the ion implantation equipment industry."

At the time of Rose's passing in 2017, at age 92, his family included these words in his obituary published in the *Gloucester Daily Times*: "Perhaps of most importance to Peter was the award given to him by the City of Gloucester, honoring him for his success in transforming the city into an employment center which impacted the lives of thousands of people in Gloucester and the surrounding area."



Sharing a laugh at work are, left to right, Andrew Wittkower, Peter Rose and Geoffrey Ryding, 1986.

A Leader by Example

More than a science-driven inventor, Rose proved himself to be a workingman's friend, leading by example, never known to hide in his office. The late Dick Josephson, facilities manager at Varian, recalled in a *Boston Globe* interview how, in the early days, Rose was often on the floor with his employees, sleeves rolled up, and working alongside them late into the night to finish

a project. His English accent and occasional British mannerisms were no barrier. “It makes no difference what part of society you come from,” Josephson said. “He (Peter) was held in esteem by everyone he worked with. He didn’t have any airs about him. I don’t care who it was; he would sit down and talk with you.” After a hard day’s work, Rose often could be seen socializing with his co-workers.

Blackburn Industrial Park was a far cry from Extrion’s first location in a rented leather factory in Peabody with sheets draped over the rafters serving as a “clean room.” The cellar regularly flooded, causing concern as their work required high-voltage power. The late Peter Bazeley recalled in the *Boston Globe* article, “There were safety alarms all over the place, and when these would go off, everyone would troop outside and head to a nearby bar. Peter would start buying rounds, and it would be awful trying to get everyone back to work.” The tradition continued, Bazeley said, after Extrion moved to Gloucester, often at the Harbor Café, now called The Rhumb Line.

Wittkower also shared impressions of Rose’s joy, good humor, and generosity: “One early evening after work,” he recalled, “Peter invited all 10 or 12 of us for beers at a favorite haunt, a bar on Nutting Lake in Burlington, MA. In a fit of inspired generosity, he sent in an order for 100 beers. The bartender needed four trips to bring out the order.”

A “Bar Brawl”

Peter Souza, a mechanical assembler at Extrion, added an anecdote to round out Rose’s involvement with workers at the company. He recalled a day when there was a physical altercation in the men’s room. The entire crew, then about 45 employees, stood outside the doorway, listening to the brawl. Rose heard the ruckus and came from his lower-level office to the front of the crowd and listened too. “Nobody wanted to go in,” Souza said. “With a concerned look on his face, Peter turned to me and said, ‘You go in and break it up . . . you hang around in bars!’” Souza said this seemed ironic because almost the whole crew hung around in bars after work with Rose. Still, Souza went in and broke up the fight with an old-fashioned janitor’s rag mop. The stall walls and doors were broken, and both parties were pretty well battered. All three men walked out of the men’s room, and Rose said, “Thank you!” and went on his way.

Personal Life

Peter Rose lived in Rockport until his death; he loved boating but was primarily a freshwater sailor, piloting Hobie catamarans at Lake Sebago in Maine. He also hiked the Atlantic Path in Rockport and, in winter, enjoyed skiing in New Hampshire. His obituary recalls his lifetime love for dogs, particularly Labrador retrievers. His early compatriots in Gloucester said that, after a tough day at work and a couple of beers, he often would offhandedly remark that he would rather “go build a mahogany boat.” Peter acknowledged with slight regret in the *Boston Globe* interview that it had never happened.

Souza recalled many visits to the Rose home in Rockport. “Peter and Margaret both loved steamed clams,” said Souza. “I used to dig clams in Jones Creek, often dropping off several quarts to their house for an evening dinner. And, of course, they insisted I stay and eat.”

Souza recalled the Rose home as being similar to an English cottage. “Each gathering was full of great conversation, and Margaret and Peter would always make everyone feel welcome.” He added, “I remember Peter as affable, humble, even courtly, and still at work as he approached his eightieth birthday, rightfully proud of the life he lived.”

Several years after Rose’s death, Wittkower and Geoffrey Ryding, who also worked with and alongside Peter for nearly five decades starting at Extrion and beyond, offered a written tribute to Peter, concluding with these impressions: “Peter was a gentleman, in both interpretations of the word, who worked hard and played hard. Rather than raise his voice in anger, he would raise a glass in celebration. He was great fun to be with, both in and out of work. We miss him.”

Peter Henry Rose died peacefully at his home in Rockport on March 23, 2017.

ACKNOWLEDGMENTS

The production of this story represents a collaboration between writers Jerry Ackerman and Matthew Beach, Gloucester400+ Workshop Instructor Lenore Balliro, and Gloucester 400+ Stories Project Leader, Terry Weber Mangos. Thank you to David Wittkower for participating in interviews and Peter Souza for sharing memories of Peter Rose.

ABOUT THE AUTHORS

JERRY ACKERMAN

Jerry Ackerman was an editor and staff writer at the *Boston Globe* from 1971 to 2001 and, before that, managing editor of the *Gloucester Daily Times* and a reporter at newspapers in Illinois. He shared in the Pulitzer Prize for Public Service in 1975, holds journalism degrees from Northwestern University, and was a Professional Journalism Fellow at Stanford University. Portions of this essay (written by Jerry) appeared in the *Boston Globe* in 2002 and are based on interviews and research done at that time.

MATTHEW BEACH

Matt Beach is a resident of Gloucester; he moved here after joining Varian in 1997 as a Final Test Technician. Matt is the Director of Market Analytics for the Varian division of Applied Materials. In this role, Matt oversees all aspects of market analysis, including technology trends and inflections, competitor tracking, revenue forecasting, and Strategy Planning for all Varian products. Along with his team, we provided data analytics to support decision-making for the leadership team.

He spent his first eight years traveling to various customer locations around the globe, performing final tests on Ion Implant equipment. As his travel slowed, he moved into various leadership roles in the Marketing and Strategy organization.

Before joining Varian, Matt was an electronics technician in the U.S. Navy. He enjoys cooking and entertaining with friends, is an active hiker, and loves traveling.

MORE ABOUT ANDREW B. WITTKOWER

Andrew Wittkower, a Rockport resident, is one of the founders of Extrion Corporation (now Applied Materials) and was a close colleague of Peter Rose. He had a career that took some unexpected turns. After his initial attempts (while at the Cavendish Laboratory in Cambridge, UK) to understand nuclear physics failed, he turned to atomic collision physics. He was granted a PhD from University College, U. of London. He began his first career as a research scientist by joining an innovative group led by Prof R.J. Van de Graaff and Dr. Peter Rose at High Voltage Engineering Corporation in Burlington, MA. While there, he published over 100 papers on ion sources and charge-changing collisions in tandem particle accelerators in scientific, technical, and popular journals.

Wittkower's second career, which lasted 20 years, was as a manufacturer of ion implantation equipment. In 1970, Wittkower, Rose, and four others founded Extrion Corporation as described above. Subsequently, Wittkower became the Founder and/or President of Nova Associates (now Axcelis), Zymet, ASM Ion Implant, High Temperature Engineering and Superior Design – all manufacturers of semiconductor fabrication equipment. For these achievements, Andrew Wittkower (together with Peter Rose and Roger Bastide) was honored with the 1986 SEMMY Award by the Semiconductor Equipment Manufacturers International (SEMI).

Subsequently, Andrew Wittkower entered his third career, fabricating and promoting a new semiconductor

material – Silicon-on-Insulator (SOI). In 1986, he became a Founder of Ibis Technology, the first commercial manufacturer of SOI wafers. In 1992, he was a founder of Soitec USA (a subsidiary of Soitec S.A. in Bernin, France), now the world's largest producer of SOI wafers. He remained its President until 2005 when he became President Emeritus. He is a Life Fellow of the IEEE and a Fellow of the APS and Inst of Phys (U.K.).

SOURCES

Jerry Ackerman has previously interviewed Peter Rose, and Matthew Beach and Terry Weber Mangos recently interviewed Andrew Wittkower.

Abstract from the 2018 22nd International Conference on Ion Implantation Technology (IIT): "Peter H. Rose – Father of Ion Implantation: The Early Years," by Andrew Wittkower and Geoffrey Ryding, <https://www.axcelis.com>

Physics Today, August 17, 2017, "Peter H. Rose," by Andrew Wittkower and Geoffrey Ryding, <https://pubs.aip.org/physicstoday/Online/5435/Peter-H-Rose>

Boston Globe, March 2017, "Peter H. Rose" (obituary).

Boston Globe, September 18, 2002, "Chip Industry Traces Its Roots to a Visionary," by Jerry Ackerman, Page 104.

https://www.axcelis.com/wp-content/uploads/2023/05/Father_of_Ion_Implantation.pdf