



Gustav Konrad Medicus

tem a versatile and more useful diagnostic measurement tool that is still used today in plasma dry-processing for microelectronics. In 1966, he introduced the guard-ring probe and a number of novel techniques for economically fabricating miniature spherical probes. His other accomplishments include making several improvements in gas lasers, developing ultrahigh-vacuum gas valves, inventing matrix-cathode material that is shapeable by plastic deformation, and creating an excenter mill (replacement for a ball mill). He received patents for all of those achievements.

An internationally acclaimed researcher, Medicus was invited to lecture at many of the International Conferences on Ionization Phenomena in Gases and at prominent universities in the US and overseas. He produced numerous publications during his career.

In recognition of his research excellence and his contributions to the air force, Medicus was granted, in 1962, a public-law appointment, one

of the highest-level civil-service positions in the US government. During his civil-service career, he received many awards, including the Air Force Scientific Achievement Award in 1962 and the Air Force Systems Command Certificate of Merit in 1970.

After Medicus retired in 1977, he remained active in his field and consulted for Systems Research Laboratories in Dayton, Ohio. During those years, he also pursued his lifelong interests in the flora and fauna of exotic places. He traveled extensively with his daughter Berta and visited such places as South Africa, Costa Rica, and Madagascar. His colleagues and friends miss his excited accounts of those experiences.

Alan Garscadden

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Martti Mikael Salomaa

Martti Mikael Salomaa, a professor of theoretical materials physics at the Helsinki University of Technology (TKK), died of natural causes on 9 December 2004. He contributed to many areas of condensed matter theory, including superfluid helium-3, Bose-Einstein condensation (BEC) of alkali atoms, superconductivity, quantum computing, and acoustic-wave propagation in solids.

Salomaa was born on 6 October 1949 in Kotka, Finland. He was one of two Finn students who were the first to receive a scholarship to study at Atlantic College in Glamorgan, Wales. He completed his secondary education at Atlantic, where his lifelong love for the sea and sailing began. His successfully designed high-speed lifeboat for a student project was one of his proudest accomplishments. Building was a passion, and his final years of

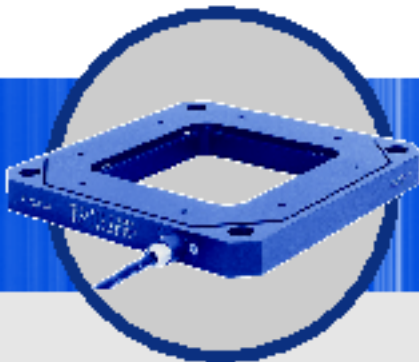


Martti Mikael Salomaa

life were enlivened by the construction he and his wife, Margaretha, undertook of a summer cabin on an island in the Baltic.

Salomaa took his undergraduate and graduate degrees at TKK, where he received his Licentiate of Technology degree in 1974 and his PhD in 1979. Building on earlier work on normal ^3He , his thesis, which was carried out under adviser Christopher Pethick and in collaboration with Gordon Baym, laid the foundation for the theory of the mobility of negative ions and electrons in the superfluid phase. That work fitted squarely into the ultralow-temperature experimental program at TKK's Low Temperature Laboratory.

After spending time as a postdoc first at UCLA and then at the University of Virginia in Charlottesville, Salomaa returned to Helsinki in 1982 to become director of the Low Temperature Laboratory's theory group. The next period of his career saw the elucidation of vortex structures in rotating ^3He . Salomaa, with Grigory



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Volovik, made fundamental contributions to that area. In particular, the two showed that the v-vortex, a non-axisymmetric vortex, can be stable. That finding was important in resolving the nature of the vortex-core transition in superfluid ^3He , which had been discovered experimentally some years before. For that work, they received the K  rber Foundation's Award in 1987 for the Advancement of European Science. Their jointly written article published in *Reviews of Modern Physics* in 1987 is still a standard reference on the topic.

Salomaa became an associate professor in 1994 and, in 1996, was named both a full professor of theoretical materials physics at TKK and director of TKK's Materials Physics Laboratory. His tremendous energy and organizational skills made him an appropriate choice to direct the lab. He was determined to move the facility into new areas and did so successfully, and active collaborations with prominent scientists from the US, Japan, and European countries became a feature of the lab. Salomaa built a theoretical research group that worked in BEC, quantum computing, and nanotechnology. He also reorganized the curriculum to include those forefront topics. In nanotechnology, the group contributed to the theory of quantum dots, superconducting interfaces, scanning-tunneling-microscope spectroscopy, and other subfields. In BEC of alkali metal atoms, his research group studied the structure and stability of multiply quantized vortices at ultralow temperatures. In quantum computing, the group has been working on optimizing the computing resources both in holonomic quantum computing and in ordinary Hamiltonian quantum computing.

In 1996, Salomaa initiated a large, new area of theoretical and experimental research in the Materials Physics Lab: the propagation of surface and bulk acoustic waves (SAWs and BAWs). The group doing this research has become one of the largest and most active worldwide. Filters that use SAWs and BAWs are fundamental components of mobile phone systems and Bluetooth technology; consequently, they have been of great importance to the Finnish economy. The group's work on Green's-function theory of leaky SAWs, propagation of SAWs in reflecting structures, and laser probing (visualization) of gigahertz-range SAW devices are fundamental contributions. A remarkable paper on acoustic loss mechanisms in leaky SAW resonators earned Salomaa and his collaborators the 2002 Outstanding

Paper Award, given by the Institute of Electrical and Electronics Engineers' Ultrasonics, Ferroelectrics, and Frequency Control Society.

Salomaa was a very patriotic Finn whose career was dedicated to ensuring that Finnish physics and technology meet the highest international standards. He succeeded, both in his personal scientific work and in the work of the material physics laboratory that he headed.

Robert Joynt

University of Wisconsin-Madison

Mikio Nakahara

Kinki University

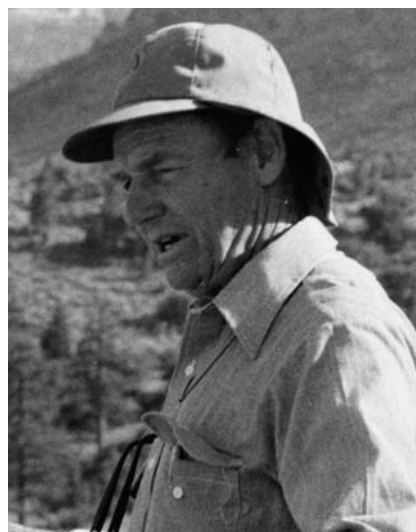
Osaka, Japan

Robert Phillip Sharp

Robert Phillip Sharp, one of the leading figures of American geology, died peacefully in his home in Santa Barbara, California, on 25 May 2004. Bob's enormous contributions on the physical processes that have modified the surfaces of Earth and Mars are scientific classics that have substantially enhanced our understanding of the unique roles of water, wind, and ice in modifying planetary surfaces. Virtually an equal contribution was Bob's vision and leadership in geological academia, primarily at Caltech.

Bob was born in Oxnard, California, on 24 June 1911. As an undergraduate at Caltech in the 1930s, he was quarterback of the football team in his senior year and an outstanding student. He chose to do his doctoral work at Harvard University and prepared a thesis, under Kirk Bryan, on the geology of the Ruby-East Humboldt Range area of northeastern Nevada, where his discovery of Pleistocene glacial landforms in the summit area sparked an interest in glaciers and glaciation that persisted throughout his career. He also participated in a two-month geological expedition boating down the Grand Canyon, the inner gorge of which was, at the time, essentially terra incognita in terms of its geology.

Jobs were scarce in 1938, when Bob obtained his doctorate, and he felt lucky to land an academic position at the University of Illinois. He was called into military service with the US Army Air Corps five years later and researched and wrote survival manuals for downed fliers in the North Pacific-Alaska region. His personal survival experiences in the westernmost Aleutians and on the slopes of Mt. McKinley further stimulated his interest in a variety of geological topics, particularly glaciology.



Robert Phillip Sharp

After a brief postwar period at the University of Minnesota, he returned in 1947 to Caltech, where he spent the remainder of his academic career. His teaching was legendary, particularly his introductory geology course. On nomination by a group of undergraduates, he was named by *Life* magazine in 1950 as one of the top 10 US college teachers of the year. In 1952, he was appointed chairman of the division of geological sciences and, during the ensuing 16 years, played a central role in building Caltech into a leader in innovative efforts in geochemistry and planetary science.

In his research, Bob embarked on a major drilling program on the Malaspina Glacier in southeastern Alaska in an attempt to better understand the physics of glacier flow. He subsequently shifted that effort to the Blue Glacier on Mt. Olympus in northwest Washington. His collaboration with geochemist Sam Epstein led to pioneering efforts in climate change. Bob also studied the role of wind as a geological agent; his work on dune formation is particularly well known. Around 1961, another important chapter in his scientific career began with attempts to understand geological surface processes on Mars. Bob and Caltech colleagues formed the team to evaluate the *Mariner* TV imaging of Mars and contributed to the recognition of the role water played in Martian evolution, still a central theme in our growing understanding of that planet.

Bob's leadership at Caltech was punctuated by two major developments. The first was the phasing out of the vertebrate paleontology program and a major thrust, supported by Linus Pauling and others, into the