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PREBEN EMANUEL GUDMANDSEN (1924–2019)

Preben Emanuel Gudmandsen passed away on 2 May 2019, in Denmark, after a very successful career at the Technical University of Denmark, during which he was strongly involved in Arctic research. He received his MSc in electrical engineering in 1950 and then worked as a research engineer at the Microwave Laboratory of the Academy of Technical Sciences, Denmark until 1957. From 1957 to 1960, he worked as a research scientist and later section head at SHAPE Air Defence Technical Centre, The Hague, Netherlands. From 1961 to 1994, he was associated with the Technical University of Denmark, Lyngby (Electromagnetic Institute), first as associate professor, and from 1972 as Professor of Microwave Techniques.

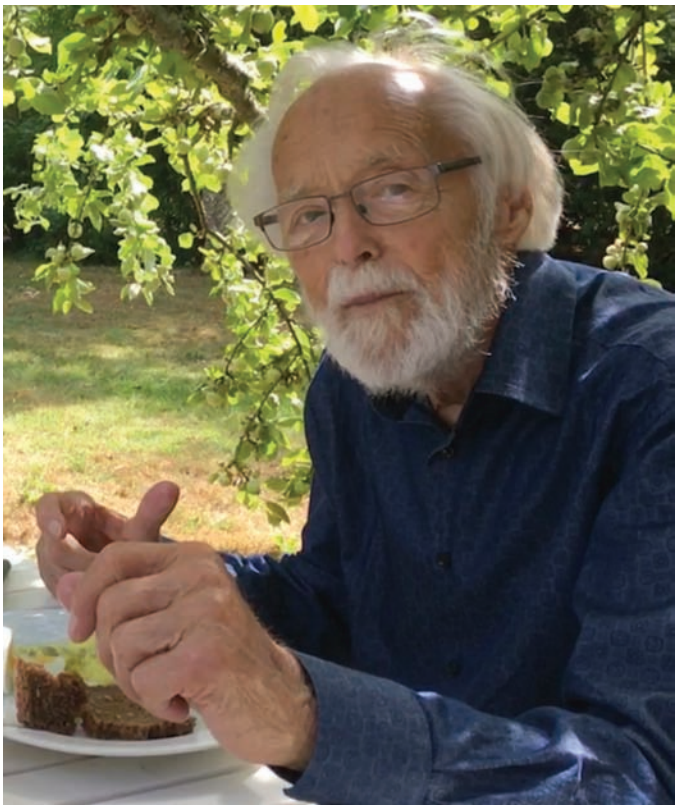
In 1967, Preben Gudmandsen initiated remote sensing activities using airborne radio-echo soundings of the Greenland Ice Sheet, a project that involved more than 10 years of equipment design, field measurements, data interpretation, mapping, and analysis.

Based upon this involvement in Arctic research, Preben Gudmandsen was appointed a member of the Commission for Scientific Research in Greenland, in 1972. As part of the "Greenland Ice Sheet Project (GISP)" from 1971 to 1981 (a cooperation between Denmark, Switzerland, and the USA), Preben Gudmandsen designed radar sounders to be installed in an aircraft with special antennas for 60 and 300 MHz. More than 60 000 km of profiling was carried out in Greenland. Based on these soundings, contour maps of the ice surface and the bedrock underneath the ice were prepared. The mapping of the bedrock topography formed the basis for selecting the correct drilling locations at the Summit for the European Deep Drilling Project (the Greenland Ice Core Project [GRIP], 1989–92) and the corresponding U.S. GISP II project, which aimed to procure an ice core covering the longest possible time span of about 300 000 years.

Such radio-echo soundings in Antarctica 1975–78 were also part of a cooperative effort between the U.S. National Science Foundation, the Scott Polar Research Institute in Cambridge, and the Technical University of Denmark. The Gudmandsen Ice Radar has since 1987 been used by the U.S. Geological Survey.

Preben Gudmandsen and his group have also conducted studies of remote sensing of the open ocean and sea ice, including developing a sensor for an airborne surveillance system. Three microwave radiometers at 5, 17, and 34 GHz were developed. In addition, a digital real-time processor for use in synthetic aperture radar (SAR), as well as real-time digital data presentation equipment were constructed. Studies of interpretation procedures of multi-frequency radiometer data were carried out for recording ocean parameters such as surface wind, surface temperature, and surface salinity.

With Preben Gudmandsen as leader, the Commission for Scientific Research in Greenland at the Technical University of Denmark convened an international workshop—Eastern Arctic Science—in 1979, which dealt with geophysical processes in the Arctic region from North Greenland to the Scandinavian Arctic.



Preben Gudmandsen (Photo courtesy of Peter Gundmandsen).

With cooperation between the Commission and other Danish research councils in 1980, Preben Gudmandsen succeeded in having a digital image-processing unit installed at the Technical University of Denmark. This unit—the Danish Interactive Digital Image Manipulation System (IDIMS)—was the first of its kind at the university. Preben Gudmandsen accordingly made a very important contribution by introducing digital image processing in very different disciplines in science, ranging from oceanographic research to neurological brain analysis.

Preben Gudmandsen initiated and participated in the East Greenland Current Project, which studied a current of significant importance to climate studies in the Northern Hemisphere. This project was followed by the Greenland Sea Ice Project (1987–95), an international study of meteorological, oceanographical, and biological processes in the Greenland Sea, coordinated through the Arctic Ocean Science Board.

Preben Gudmandsen contributed to a number of contracts with the European Space Agency (ESA) and since 1972 participated in various ESA working groups. He was principal investigator for the European Remote Sensing Satellite (ERS-1) project related to research in the Greenland Sea. He was the Danish representative

to the initiatives of the European Union concerning an environmental data network, the Center of Earth Observation, and he was a member of the Advisory Board for the European Microwave Signature Laboratory at the European Joint Research Centre.

In 1982, Preben Gudmandsen founded the Danish Remote Sensing Society and until 1994 he was vice-chairman of the Danish Space Research Board. After his retirement in 1994, he continued working at the Technical University of Denmark at the DTU-Space.

Preben Gudmandsen was a unique initiator and inspirator, and under his leadership and thanks to his efforts, a great number of young scientists have produced doctoral theses. At a high international level, he has contributed to advances in primary geophysical sciences by creating new sensor equipment as well as new methods for analysis and data interpretation. His enthusiasm and broad technical and physical knowledge, together with his engagement in different scientific disciplines, have been of decisive importance for the use of remote sensing in science, as well as in public operational daily services in Greenland.

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