VERNED EDWARD SUOMI
(6 December 1915–30 July 1995)
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Scholar, thinker, teacher, scientist—all apply to Professor Verner Suomi, but he will be forever remembered as the father of satellite meteorology. Dr. Suomi’s most influential invention was the spin-scan camera, which enabled observations of Earth’s weather from space. This technology, dating to 1965, is still in use today.

Verner Suomi was a giant of modern science. His inventions were simple and elegant, and their consequences are ubiquitous. Anyone looking at a satellite image of Earth on the evening weather is looking at the product of a rare mind.—John Wiley, Provost, University of Wisconsin–Madison

At the Tropical Rainfall Measuring Mission . . . workshop, held at Goddard Space Flight Center . . . a question was raised as to whether Professor Suomi was to satellite meteorology as Mickey Mantle was to baseball. The resounding response was, “No—Mickey Mantle, while being great, did not invent baseball!”—David B. Wolff, Research Associate, Department of Meteorology, Texas A&M University

Professor Suomi’s scientific legacy is unquestionably impressive. He invented numerous weather satellite instruments, bettering our understanding of the global atmospheric circulation. For his Ph.D. thesis (1953), he studied the local energy budget, using a cornfield as his experimental laboratory. For the first meteorological experiment from the Explorer VII satellite (1959), he analyzed the radiative energy balance of the Earth. Many successful heat budget experiments of the Earth were followed by planetary investigations with similar instruments for Venus and Jupiter space probes.

ALWAYS A TEACHER

Suomi began his career as a teacher and continued teaching for more than fifty years.

A broad physical insight into a wide variety of subjects fosters
creativity. As an example, my own education was a mess. That is, I wanted to be an engineer, but due to financial constraints during the Depression, it was not possible to enter a university, so I attended a teacher’s college. Fortunately, we had some very good teachers, mainly in physics and chemistry, who gave me a very good background in those subjects. Some years ago, when Ragnar Rollefson was chairman of UW-Madison’s Department of Physics, I expressed to him my wish that my physics coursework had gone further than freshman physics. He gave me a great compliment when he said, “You’ve surely gotten a lot of mileage out of freshman physics.”—Verner Suomi, professional issues class, 1988

After receiving his B.S. in 1938 from Winona Teachers’ College in Winona, Minnesota, he taught high school science until 1941. When World War II started, he enrolled in a civil air patrol course and was so taken with the new science of meteorology that he began studies at the University of Chicago and taught practical meteorology to pilots. In 1948, he became one of the first faculty members in the Department of Meteorology at the University of Wisconsin in Madison. In 1953, he received his Ph.D. from the University of Chicago. He taught at UW-Madison for his entire career, except for appointments at the National Science Foundation (1962) and as chief scientist of the U.S. Weather Bureau (1964). He twice chaired the department (1950–52, 1954–57). Suomi retired from formal teaching in 1986 but continued teaching a weekly undergraduate meteorology course in emeritus status, saying it was a joy to him.

Creativity is trying to understand the very fundamental things. You have an opportunity to do that when you are forced to teach. You can’t stand before a group of students, most of whom are brighter than you are, and dissemble. It just doesn’t work. Someone in back’s going to start yawnning, at the very least. Teaching is a fantastic filter enabling you to get to the heart of matters.—Verner Suomi, professional issues class, 1988

His greatest accomplishment, in my view, was not a scientific achievement, but his ability to immediately find people’s comprehension level and communicate in an understandable context, whether it was grade school or postdoc.—Robert J. Fox, Executive Director, Space Science & Engineering Center
SCIENTIFIC LEADER

Early in his tenure at the University of Wisconsin, Suomi became interested in the possibilities associated with satellites.

When I first began my work with meteorological satellites, no one in the Department of Meteorology seemed particularly interested, but they didn’t try to impede progress in the field, for which I’m forever thankful. Freedom and the opportunity to make all the mistakes you want to make are very important freedoms. Call it academic freedom, if you wish, it’s a helpful catalyst to creativity.—Verner Suomi, professional issues class, 1988

In 1965, Suomi founded the Space Science and Engineering Center (SSEC) to specialize in atmospheric research and instrument development for satellites and space probes. Later, he spearheaded development of a computer system to manage data from “his” satellites. He was the first director of the Cooperative Institute for Meteorological Satellite Studies (a joint NOAA-UW institute founded in 1980). Professor Suomi never forgot his real employers or purpose, and every morning looked at the plaque dedicating his center “to the understanding of man’s physical environment and its use for the benefit of mankind.”

His inventions led to useful products that expanded knowledge—geostationary satellites to show weather systems passing over the face of the Earth, a powerful computer system to enable earth scientists to “drink from the fire hydrant” of enormously large satellite databases and to enhance images of the planets, and instruments to measure Earth’s and other planets’ heat budgets.

Suomi knew that his work had impact on both scientists and nonscientists alike.

I am an amateur pilot who recently crossed the North Atlantic in a single engine Cessna aircraft nonstop from Gander, Newfoundland to Shannon, Ireland. If not for satellite imagery for which he was so responsible, I probably would not be alive to recount this small personal endeavor. The high resolution images we received from the Canadian Aviation Meteorological Agency were key to the success of the mission and indeed saved our lives.—Anonymous e-mail
A UNIQUE INDIVIDUAL

Professor Suomi was a unique combination of scientist and humanitarian. Using his rare intellect and imagination, he could generate ideas seemingly at will. He was humble and could explain the most complicated concepts simply and without condescension.

A freshman meteorology student could say to him, "I don’t understand the heat budget, Professor Suomi." He would raise both hands in the air and say, "It's very simple." He wouldn't mention that, as the weather satellite pioneer, he knew, intimately, the heat budget of the Earth.

I think that one rarely finds an elegant solution of a problem logically. You stew around, and stew around, and all of a sudden, it comes in five minutes, or in fifteen minutes, but not in five weeks. You have to use logic and mathematics to convince others, the hard part, an important part, because it's impossible to be objective about a feeling. If you have a feeling that something ought to be done in a certain way, that's not good enough. It has to be tested with math and logic... .

I get credit for McIDAS (Man computer Interactive Data Access System), but the engineers, programmers, and so many others should have the credit. My contribution was very simple. First of all, Ted Fujita at the University of Chicago was a better photographer [than I was] and made better movies with the satellite imagery. . . . But, because it was my satellite, I wanted to find a better way. About that time, I was watching a football game and an instant replay came on. I said, "Ha! We could replay the weather!" The notion was to write down on one spin of the platter which was on instant replay, analog disk those days. They don't do that any more; i.e., put down each scan line in the proper place, which required pretty fancy timing but engineers can do anything if you define the problem. They may spend a lot of money or a lot of time, but they get the job done, as they did in this case. So we had instant replay of the weather. Now we see the concept used on television all over and in classrooms, thankfully, but it was really pretty simple.—Verner Suomi, professional issues class, 1988

Equally simple, according to Suomi, was the idea for an instrument that measured the difference between Earth's incoming and outgoing radiation. This net radiometer formed the basis of Suomi's later energy
budget work.

One day my student, Peter Kuehn, showed me an article by Patterson who had measured temperature on both top and bottom of a foot bridge somewhere in Norway. Dr. Patterson found a significant temperature difference between top and bottom. With that information, it didn’t take much imagination to deduce that we could make a net radiometer. We could increase the temperature difference by using a better insulator than wood—Styrofoam or fiber glass—and, because we would surely want this to work in the wind, too, we’d need a wind screen. I remember looking in a chemistry text or journal and finding the spectra of various films. Amazingly, the cheap, ordinary polyethylene film used to wrap your dry cleaning is very transparent in the infrared. We made little window screens out of the polyethylene film. Obviously, the thinner the polyethylene film, the less absorbent. It unfortunately has a pretty strong band around 14 microns, so this isn’t much of a gadget in the stratosphere which is heavy with carbon dioxide, and where most radiation is. In the troposphere, the film works very well. So, although Richard Goode and others insisted that the heat budget could not be measured, we found that it can indeed be measured in the troposphere.

This little gadget [the net flux radiometer] worked more or less on first principles, and it’s been used for many papers. I wrote one or two papers on it; I didn’t want to fuss over it; it’s pretty simple.—Verner Suomi, professional issues class, 1988

Suomi’s scientific method relied as much on imagination and vision as on hard facts.

I first met Professor Suomi as a student in 1958, in a meteorological instruments course. I admit that I don’t remember much about meteorological instruments from the course, but I do remember his philosophy: it was fair game to take any instrument apart and reassemble it in some other fashion if that helped achieve your scientific objective.—Robert J. Fox, Executive Director, SSEC

His understanding was based on an inherent and keen sense of physics and on his engineering practice; he taught us by explaining and illustrating the physical basis of his innovative concepts using easily understood “common sense” and familiar principles we practice as part of our every day life. Professor Suomi’s intellectual
genius was intimately connected to his unique vision of simple, and elegant, solutions to important and often complex problems.—William L. Smith, Chief, Atmospheric Sciences Division, NASA Langley Research Center

His passion for science continued unabated up to his death in 1995. The Monday before his death, he had a telephone conversation with a colleague:

It was an extraordinary phone conversation, one half hour or so totally devoted to science and, in particular, using the Global Positioning System for Meteorology and his ideas about how it should continue to develop and be used. He described, in great detail, his conversation that morning with JPL scientists and engineers about how to fix the multipath problems they were having in extracting the moisture profiles from the raw GPS signals—incredible, yet so much like the man and the scientist.—Richard Anthes, President, University Corporation for Atmospheric Research

MENTOR AND FRIEND

Professor Suomi’s humility, generosity, and encouragement grew to legendary proportions as well.

A student of mine [Pamela Naber-Knox] made use of satellite data in an interesting way and stimulated the idea for a major research program. Professor [James] Weinman used a bunch of children’s black [building] blocks in an experiment which measured reflectivity as a function of angle; his results showed that former theory didn’t fit. I suggested that Pam look into this. From the vast store of satellite pictures at SSEC she found some beautiful imagery. Thanks to her a whole new project was started, the First International Satellite Cloud Climate Regional Field Experiment, FIRE. If she hadn’t devoted her research to that particular topic, FIRE wouldn’t have taken place.—Verner Suomi, professional issues class, 1988

I think the best lesson I learned from him was that you can get anything accomplished if you let other people take the credit for it. Vern made many great things happen that way because he was too big a human being to have a sensitive ego. . . —Joanne Simpson,
Chief Scientist for Meteorology, Earth Sciences Directorate, NASA Goddard Space Flight Center

When the new National Hurricane Research Program was in danger of being closed down because of contractor problems, Professor Suomi helped “find a small young New England firm willing to contract the completion of this job for a fixed sum that did not exceed the remaining funds in our special appropriation. Then he followed through, to monitor this work and assure it was done properly. Along the way he added his creative ideas in helping the young company do a better job more cheaply than they had thought possible to do. The net result was that where we had stood to lose NHRP altogether, with Vern’s skills and selfless efforts, we ended up with marvelously instrumented planes from which a bounty of vital information has continued to be collected through the years.” This triggered substantially an unabounded growth of research in tropical meteorology—with all this has meant to the understanding of global weather and climate.—Robert Simpson, Director (retired), National Hurricane Center

After I finished my Ph.D. in the Netherlands, I wrote to a number of universities in the U.S. with programs in meteorology asking for job opportunities. There was one opening for a postdoc position at the University of Wisconsin with Dr. V. E. Suomi. It took about 8 months to obtain an immigration visa and in this period Vern worked tirelessly on my case. When my family and I finally arrived in Madison in August 1956 we were welcomed by the Suomis as royalty. They gave us their master bedroom and then went around with us to find accommodations. It was a most memorable entry into the United States. After we got settled, Vern introduced me to the work I was going to concentrate on. “It will not take much more than a weekend,” he said. . . . Two years later the job got finished and he was quite pleased.—Joost Businger, Professor Emeritus, Department of Atmospheric Science, University of Washington

In the ‘60s, while in Science Hall and the days of faculty personally advising undergraduates, one young man reported to Verner Suomi that he was unable to enroll since he did not have enough money to pay tuition. Without hesitation Professor Suomi offered moneys for his tuition. This young student later finished his undergraduate degree. Verner Suomi was an
incredibly sensitive individual with an unusually warm heart for those who needed a friend, comfort, advice or support.—Donald R. Johnson, Director, Division of Earth Sciences, Universities Space Research Association and Associate Director, SSEC

After his first heart attack, Professor Suomi gave up smoking. He encouraged his friends to do the same by presenting them with a postdated check they could cash if they did not smoke in the interim. “Vern was undeniably a very bright man; however, I think he never understood the reason his ‘check therapy’ worked. He thought it was the check, the money. Wrong. It worked because it was his check. It worked because it was a check with Vern’s signature on it. It worked because that signature was the signature of a man I admired. It worked because that check represented a challenge put to me by one who thrived on having challenges put to him. It worked because such a man cared enough about me.”—Hank Schmidt, Chief (deceased), Advanced Development and Design Laboratory, National Weather Service

Coming to work for Professor Suomi was the best thing that has happened in my professional life. He encouraged me to publish and to get a Ph.D., and he gave me the opportunity to manage his 4-D graphics project. He cared deeply about the people who worked for him and his strength lifted us all up.—Bill Hibbard, Scientific Visualization Project Leader, SSEC

From day one, he had always called me his bean counter, a term I first heard from him and one that I was not overly fond of. One day he invited me to attend a meeting with some dignitaries from Washington. He introduced me by name and told the group I was the SSEC bean counter. There was a low-level chuckle in the room in response to his use of that term and he instantly flared. With a very sharp edge to his voice, he barked at the group, “Listen, like I said, he is a bean counter, but don’t you ever forget, he is a damned good one!” You could have heard a pin drop. He paused a few seconds for effect, then proceeded to start the meeting. I have worn the Bean Counter title proudly since that day.—John Roberts, Assistant Director, SSEC

A MAN OF WIT, CHARM, CLASS, AND STYLE
Verner Suomi was born 6 December 1915, in Eveleth, Minnesota. He died at University Hospital in Madison, Wisconsin, on Sunday, 30 July 1995.

He remained mentally vigorous, and demanding, till the day he died. I visited him in the hospital the week of his death and as I walked into his room he said, "Have you written my obituary? I don’t want to read it, but you could call me the father of weather satellites. Just make sure there’s no fuss."—Terri Gregory, Public Relations Specialist, SSEC

An eminently quotable man, Suomi perhaps sums up his accomplishments and philosophy best:

I often say, rock the boat. But before you rock it, do three things: measure the freeboard on the boat, notice the state of the sea, and the distance to shore. Only then rock the boat.

ELECTED 1976

TERRI GREGORY
Public Relations Specialist
Space Science and Engineering Center
University of Wisconsin–Madison