CURRICULUM VITAE

Name: Hermann E. Gerber (Tel 703-742-9844; hgerber6@comcast.net)

Address: Gerber Scientific, Inc.,1643 Bentana Way, Reston, VA 20190

Professional Preparation: B.S. Physics, Drexel University, 1964
M.S. Meteorology, New York University, 1967
Ph.D Meteorology, Colorado State University, 1973

Positions:
2010 - present: Dept. Atm. Sci., Adjunct Professor, University of Utah
1991 - present: President and Chief Scientist of Gerber Scientific, Inc.
1983 - 1991: Head, Aerosol Physics Section, Naval Research Laboratory (NRL)
1975 - 1983: Research Scientist, Atmospheric Sciences Branch, NRL
1964 - 1975: Research Scientist, Atmospheric Sciences Lab (ASL), U.S. Army
1959 - 1964: Cooperative student trainee, ASL, U.S. Army

RESEARCH EXPERIENCE

Dr. Gerber has conducted basic and applied research in atmospheric sciences while employed by the U.S. Army Atmospheric Sciences Laboratory, Ft. Monmouth, NJ, and by the Atmospheric Physics Branch of Naval Research Laboratory in Washington, D.C.. He headed the Aerosol Physics Section at NRL until leaving government service in 1990. He formed, and is presently with Gerber Scientific, Inc., which specializes in grant research and instrumentation development in the atmospheric sciences.

His wide-ranging scientific interests and contributions are primarily in the fields of aerosol and cloud physics, and atmospheric optics resulting to date in about 50 journal publications, books and patents. Contributions include the following: tested Fletcher's theories of ice nucleation with sized AgI nuclei as small as 20 nm, and found the theory inadequate with measured nucleation rates differing by factor of 10^{17} (Gerber, 1976); found good agreement with Koehler theory by measuring critical supersaturation and salt nucleus content (Gerber et al, 1977); devised a means of measuring the single-scattering albedo of aerosols using a scattering and transmission cell with measurements showing values as small as 0.6 in a polluted atmosphere (Gerber, 1979b); evaluated means for measuring directly for the first time water-vapor supersaturation in clouds and fogs (Gerber, 1980; 1982a); showed that it was possible to estimate liquid water content of clouds and infrared aerosol extinction from visible light scattering (Gerber, 1984,1985); found an analytical solution to the droplet growth equation which is not implicit in droplet size but only a function of nuclei dry size and ambient RH to yield a practical haze equation (Gerber, 1985a); modeled and compared with measurements the evolution of a marine boundary layer jet (Gerber et al, 1989); calculated the aerosol backscatter in the marine boundary layer at different CO_2 wavelengths and for the North Atlantic Ocean area to evaluate proposed satellite sensors using those wavelengths (Gerber, 1991b); used the supersaturation hygrometer to measure supersaturations in radiation fogs and demonstrated with the measurements and modeling that large supersaturation gradients and fog activation were caused by mixing of different-temperature air near saturation, rather than being caused by radiative droplet cooling as had been thought earlier (Gerber, 1991c); showed that in Atlantic

stratocumulus clouds (ASTEX) a drizzle threshold existed dependent primarily on droplet concentration, and that homogenous mixing followed entrainment (Gerber, 1996a); calculated liquid water content (LWC) power spectra from high-rate LWC data collected in stratocumulus during SOCEX and found a "scale-break" in the spectra consistent with the scales of entrained parcels (Gerber et al, 2001); developed theory and a device for measuring for the first time in-situ the asymmetry parameter and extinction coefficient of cloud particles, and applied the device during SHEBA-FIRE finding parameters consistent with complex ice crystals (Gerber et al, 2000); quantified the size distributions of entrained parcels in stratocumulus and estimated entrainment rates using the conditional sampling technique (DYCOMS II; Gerber et al, 2005); and analyzed and modeled the evolution of trade-wind cumulus clouds (RICO) with respect to entrainment and drizzle formation (Gerber et al, 2008).

He is proficient in instrumentation design including in electronics, optics, and mechanics. He has applied this knowledge for originating a series of unique instrumentation useful in aerosol and cloud physics. This includes the design and construction of an aerosol concentrator for centrifugally concentrating the dispersed phase of the aerosol by as much as a factor of 80 without significant pressure and temperature changes (Stilling and Gerber, 1980). Equations were derived for the three versions of the Brewer and Beutell integrating aerosol nephelometers for measuring the aerosol scattering coefficient, and each version was desiged and constructed (Gerber, 1982b, 1984c). A combination of such a nephelometer and a transmission measurement in a new portable aerosol cell resulted in direct measurements of the aerosol single scattering albedo (Gerber, 1979a, 1979b). He developed theory for manipulating the Mie scattered light phase function to establish desired aerosol and cloud droplet optical parameters which resulted in devices for estimating long-wave extinction using visible light scattering, and also resulted in a new cloud probe (PVM-100) for measuring cloud LWC and effective radius. The latter received a R&D 100 award from R&D Magazine as one of the 100 most significant technical products , and has been used widely by the cloud physics community. The PVM-100 has the unique capability of measuring LWC at rates as high as 1000 hz. This showed that small Cu entrain more than previously thought, and that the community's consensus for the existence of large adiabatic cores measured at 1-hz data rate was erroneous (Gerber, 2000). He developed a probe for measuring directly supersaturation in a fog and cloud (Gerber, 1980); and he designed and built a cloud integrating nephelometer (Gerber, 1996c, 2000 et al) that provided the first in-situ measurements of the ice-crystal asymmetry parameter which helped resolve the issue of overly large asymmetry parameter values based on ideal ice-crystal calculations.

He participates in professional organizations (see list), has participated on research panels, and has organized several large collaborative research efforts. The former includes his 5-yr. membership in the International Radiation Commission (IRC) of the IUGG where he co-chaired with Dr. Joachim Joseph the Working Group on Optical Properties of Aerosol. In this capacity he consulted for the World Meteorological Society (WMO), edited WMO reports, organized the 1st International Workshop on Light Absorption by Aerosol Particles, and organized the International Experts Meeting on Aerosols and Their Climatic Effects, with both resulting in books. Another meeting he organized was the International Conf. On Global Aerosol Variability held in Hawaii in 1984. In 2007 he organized the NSF POST (Physics of Stratocumulus Top; http://www.eol.ucar.edu/projects/post/) research effort to deal with the inability to properly predict stratocumulus evolution, and in particular to establish the effects of the entrainment process.

WRITINGS

(* reviewed papers, and selected reports and book articles)

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* Gerber, H., 2007: Comments on "Effective radius of ice cloud particle populations derived from aircraft probes." *J. Atm. Oceanic Technol.*, *24*, 1504-1510.

* Haman, K.E., S.P. Malinowski, M.J. Kurowski, H. Gerber, and J.-L. Brenguier, 2007: Small scale mixing processes at the top of a marine stratocumulus. *Quart, J. Roy. Meteor. Soc.*, *133*, 213-226.

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* Gerber, H., J.B. Jensen, A.B. Davis, A. Marshak, and W.J. Wiscombe, 2001: Spectral density of cloud liqid water content at high frequencies. *J. Atmos. Sci*., *58*, 497-503.

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* Gerber, H., Y. Takano, T.J. Garrett, and P.V. Hobbs, 2000: Nephelometer measurements of the asymmetry parameter, volume extinction coefficient, and backscatter ratio in Arctic clouds. *J. Atmos. Sci.*, *57***,** 3021-3034.

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BOOKS

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PATENTS

Gerber, H., 1978: Hygrometer. United States Patent 4,083,249, April 11, 1978.

Gerber, H., 1983: Nephelometer. United States Patent 4,374,334, March 1, 1983.

Gerber, H., and B. Ulfers, 1985: Apparatus for determining the liquid water content of a gas. United States Patent 4,597,666, July 1, 1986.

PROFESSIONAL ORGANIZATIONS

American Meteorological Society (present member)
American Geophysical Union (present member)
American Association for Aerosol Research (4 yrs.)
European Association for Aerosol Research (2 yrs.)
Optical Society of America (8 yrs.)
American Institute of Aeronautics and Astronautics (4 yrs.)
International Society of Optical Engineering (2 yrs.)
International Radiation Commission, IUGG (5 yrs.)

RECOGNITION

Publication Commendations (2), U.S. Army Electronics Command.

Research Publication Awards (2), Naval Research Laboratory.

Letter of appreciation, Secretariat, World Meteorological Organization, for consultation.

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Letter of appreciation, American Institute of Aeronautics and Astronautics for service on technical committee.

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