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# Aerosol Science

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## Obituary

### Paul Baron (1944–2009)



Dr. Paul Andrew Baron died on May 20, 2009 at his residence in Cincinnati, OH, USA after a long battle with cancer. With his passing we have lost a leading scholar in aerosol science and occupational health research. He is survived by his wife, Diane, and two children, Sonya, of Seattle, WA, and Timothy, of Cincinnati, OH.

Dr. Baron made many contributions to, and was a great champion of, aerosol science. He co-edited the indispensable reference 'Aerosol Measurements: Principles, Techniques, and Applications' (1993; 2001; also published in Chinese in the P.R. of China)—a constant companion for many students and professionals around the world. Many in the aerosol community have used his *Aerosol Calculator*. He published over 80 peer-reviewed journal articles and many book chapters. He served as Associate Editor of *Aerosol Science and Technology*, a member of the Board of Directors of the American Association for Aerosol Research (AAAR), as well as chair or member of various AAAR, American Industrial Hygiene Association, International Organization for Standardization, and World Health Organization committees. Dr. Baron's papers have been widely cited by aerosol researchers worldwide. His achievements have been recognized by the US Government through two Public Health Service Commendation Medals (1980 and 1987), Public Health Service Outstanding Service Medal (1992), as well as several professional awards. In 2008, he received the prestigious David Sinclair Award from the AAAR for sustained excellence and achievements in aerosol science.

Paul Baron was born in Budapest, Hungary in 1944, one year before the end of World War II. His family was forced into hiding to survive the Nazi occupation. Tragically, his father was killed in the closing days of the war but the rest of the family survived the Holocaust and immigrated to the United States in 1947. Paul's aunts, uncles and older siblings helped to raise Paul, especially after his mother's untimely death. According to his sister's memories, Paul developed an interest in science very early and even had a little lab in the basement of their house when attending middle school.

Paul Baron obtained his bachelor's degree in Chemistry from the University of Illinois at Urbana-Champaign in 1965, after which he briefly worked in the Department of Physics. There, he participated in a study on the measurement of radioactive isotopes in cigarette smoke—his introduction to a lifelong involvement with aerosol science. His doctoral work at the University of California at Santa Barbara focused on the microwave spectroscopy of polar gases. After post-doctoral appointments at Monash University in Australia and the University of Kansas, he joined the National Institute for Occupational Safety and Health (NIOSH) in 1974 as a physical scientist.

As exposure to asbestos was recognized as a major health concern by the early 1970s, Paul Baron realized the importance of asbestos fiber measurement and characterization. His contributions to this research area over the past three decades probably represent Dr. Baron's most enduring scientific legacy. His early work resulted in the refinement of a fiber counting method based on phase-contrast microscopy, which remains the standard method for assessing fiber exposure. Dr. Baron's expertise was critical in the subsequent development of the fibrous aerosol monitor—a user-friendly, direct-reading monitor for asbestos. During the late 1980s and early 1990s, Dr. Baron developed an innovative dielectrophoretic classification device that separates airborne fibers by length. Fiber classification was a breakthrough for toxicology because it enabled the investigation of the relationship between

fiber length and lung disease. Using material sorted by the fiber classifier, NIOSH researchers elucidated the length-dependent cytotoxicity of asbestos fibers. These studies constitute a key piece of our understanding of fiber-induced lung disease.

In the early 1980s, Paul Baron also became interested in aerodynamic sizing of aerosols. He was a major contributor to the development of the aerodynamic particle sizer (APS) which is currently a standard tool for rapid, direct, high resolution measurement of particle aerodynamic size. Additional aerosol instruments that Dr. Baron helped to develop include: a microwave gas analyzer, an automated fiber counter (a filter sample reader for asbestos), a portable X-ray fluorescence analyzer, and a personal dust exposure monitor.

In many ways, Paul Baron catalyzed nanotechnology research at NIOSH; with his experience in fibrous aerosols, he was quick to raise concerns about the potential health risks from novel engineered fibrous materials—carbon nanotubes. He collaborated on pioneering toxicological studies of single-walled carbon nanotube exposures; the resulting widely-cited publications were recognized through two NIOSH Alice Hamilton awards (2006 and 2009). Dr. Baron's early leadership on the health effects of carbon nanotubes did much to raise national and international awareness concerning nanotechnology safety.

Paul Baron officially retired from NIOSH in 2004, but he continued his research until very recently. He also continued working on the much revised and expanded third edition of the *Aerosol Measurement* book. Nearing completion, it will be dedicated to his memory. Paul often described himself as an experimentalist with a good intuition for what can actually work. He was also a passionate educator. He mentored many young scientists, post-doctoral researchers, and students, both at NIOSH and at the University of Cincinnati. He taught at the University, served on student dissertation committees and trained students in the laboratory. He generously contributed his aerosol expertise to numerous research projects both inside and outside of NIOSH. He inspired colleagues by example; his research and work ethic evinced the dedication required to be a world-class aerosol scientist. These qualities were recognized and appreciated by the scientific community. Once his death was announced, about a hundred of his colleagues from America, Asia, Australia and Europe responded by sharing memories of their professional and personal interactions with Dr. Baron and acknowledging how much he meant in their careers and their lives.

Paul was a marvelous individual in many ways. A consummate scientist with a characteristic energy, enthusiasm, and resilience, he was also a very modest person, who invariably understated his own research contributions. Paul enjoyed keeping himself in excellent physical condition. He was an avid racquetball player; he refused to let the sport go without a fight. In recent years, despite his struggle with cancer, Paul resolutely remained active in the laboratory. He never complained about his poor health, not even during the most painful periods of cancer therapy.

The aerosol community has lost a great scholar and a wonderful person. He will be remembered as an outstanding scientist, a mentor, a generous colleague—and a friend.

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