In Memoriam: Raymond Viskanta

It was with great sadness that the heat transfer community learned of the passing of Professor Raymond Viskanta on December 27, 2021.

Raymond Viskanta was born in Marijampole, Lithuania in 1931. In 1944, his family escaped the advancing Russian-German front, fleeing to Germany. After a tenuous survival in Germany during the remainder of the war, they were moved to displaced persons camps in West Germany starting in 1945. In 1949, the family came to the United States, initially to work as farm laborers in Michigan. Raymond subsequently moved to Chicago in 1950, where he found employment as a factory worker during the day and attended high school classes in the evening.

After receiving his high school degree in 1951, he began his higher education by taking night courses at a junior college, then enrolled full time at the University of Illinois-Navy Pier. He later transferred to the main campus where he received his B.S.M.E. degree with high honors from the University of Illinois in 1955. This was followed by a M.S.M.E degree, focusing on heat transfer, from Purdue in 1956. Raymond Viskanta then accepted a position at the Argonne National Laboratory, pursuing and completing his doctoral research *in absentia*, and receiving his Ph.D. from Purdue in 1960. Professor Viskanta continued at Argonne until 1962 when he joined the faculty at Purdue as Associate Professor. He was promoted to the rank of Professor in 1966 and was named the W.F.M. Goss Distinguished Professor in 1986.

Professor Viskanta's research contributions, in the form of over 500 publications in more than 50 journals, as well as over 200 keynote presentations and invited lectures, have been immensely influential. His earliest work developed an initial understanding of radiation in participating media, including the presence of other significant heat transfer modes. Similarly, his many contributions in convection dealt with little-understood phenomena at the time as disparate as double-diffusion transport and jet impingement boiling. Professor Viskanta's research in melting and solidification in pure materials as well as metallic alloys, including solid–liquid phase change in the presence of convection in the liquid phase, was seminal. While developing the formative understanding of these and many other heat transfer phenomena, his research was simultaneously motivated by practical applications involving combustion and fire, materials processing and manufacturing, and conventional as well as emerging energy generation and storage technologies.

Professor Viskanta's service contributions to the heat transfer community were extensive. In addition to organizing many heat transfer conferences, he served as technical editor, associate technical editor, advisory board member, or honorary advisory board member of the *Applied Mechanics Reviews*, *Experimental Heat Transfer*, *International Communications in Heat and Mass Transfer*, *International Journal of Heat and Fluid Flow*, *International Journal of Heat and Mass Transfer*, ASME *Journal of Heat Transfer*, *Journal of Quantitative Spectroscopy and Radiative Heat Transfer*, AIAA *Journal of Thermophysics and Heat Transfer*, *Numerical Heat Transfer*, and the *Annual Review of Numerical Fluid Mechanics and Heat Transfer*. While he received the most prominent international awards specific to heat transfer, Professor Viskanta's professional accomplishments were also recognized by his election to the National Academy of Engineering in 1987, being named a foreign member of the Lithuanian Academy of Sciences in 1990, and becoming a foreign member of the Academy of Engineering Sciences of the Russian Federation in 1995. Among his many other accolades were his receiving an Honorary Doctorate of Engineering Degree from the Technical University of Munich in 1994, and an Honorary Doctorate of Engineering Degree from Purdue in 2007.

During his lifelong academic career at Purdue, Professor Viskanta guided the research of 64 doctoral students, 48 master's students, and 39 postdoctoral researchers and visiting scholars. His professional colleagues at Purdue remember him as an intensely focused researcher who efficiently handled his many responsibilities with warmth, grace, humor, and an enormous intellect. As shared by Frank Incropera, "During my 32 years at Purdue, I was very fortunate to have Ray Viskanta as a mentor, colleague, and collaborator. One of the most important things he taught me was that, however well today's research may be going, one should always be thinking ahead. What will be the important problems of tomorrow, and what seeds could be planted to better address those problems? Yes, he contributed enormously to the science of heat transfer, but he was often at the forefront of applications to some of society's most pressing problems. And, there is another important dimension to the life of Ray Viskanta. He was one of the kindest and most decent human beings I have ever known. For 55 years, I was blessed to have had him as a friend."

Professor Viskanta's lifelong love of heat transfer was also matched by the genuine affection he had for his graduate students who knew him as "RV." He held us to a high technical standard, at the same time providing frequent warm encouragement. We were taught to break down a research problem into smaller, more tractable subproblems. Through his careful and quick review of draft manuscripts, RV taught us to write well. A draft publication left with RV late in the afternoon would be on the student's desk early the next morning with copious notes and redline corrections. RV was anxious to give applicants from around the world the opportunity to pursue graduate study with him. His lab was a global mix of individuals with a remarkable array of backgrounds and nationalities. Those accepted for graduate study with RV were excited by the news and felt honored to work with him. One former student applied *only* to Purdue for Ph.D. study, to work *only* with RV. In response, Professor Viskanta sent duplicate personal letters to the applicant's home and university office to make sure the student was notified of acceptance.

The extraordinary research that came out of RV's lab was never more important to him than the personal lives and growth of his graduate students. All of us felt Ray and Barbara Viskanta's deep affection, and they often became surrogate parents to us, especially those of us who were far from home. The Viskantas hosted regular dinners at their home for those studying with RV, and they stayed in touch with many of his students long after graduation watching with pride their accomplishments over the years, and even the accomplishments of their students' children. When the young adult son of a former graduate student was honored for his academic performance at a university and his parents could not attend, Ray and Barbara drove several hours to the award ceremony and accompanied the son to a celebratory dinner.

Ray Viskanta was a one-of-a-kind professor, mentor, and friend. As his former graduate students and colleagues, we collectively express our deep appreciation and respect for his influence on our professional and personal lives. The international heat transfer community will remember Professor Raymond Viskanta not only as a scientist and engineer of the first class, but also as a gentle man who was deeply and personally connected to scores of heat transfer researchers and educators around the world.

With deep admiration and affection, on behalf of all of RV's former graduate students and colleagues,

Marcus V. A. Bianchi
U.S. National Renewable Energy Laboratory,
Golden, CO 80401

Theodore L. Bergman
University of Kansas,
Lawrence, KS 66044

Vijay K. Dhir
University of California Los Angeles,
Los Angeles, CA 90095

Amir Faghri
University of California, Los Angeles,
Los Angeles, CA 90095