

In Memoriam: Dave Stock—Teacher and Pioneer Researcher in Multiphase Flow

It is with profound sadness that we report the death of a much loved and greatly respected colleague and friend—Professor David E. Stock, Washington State University.

In a career spanning nearly 40 years “Dave” performed seminal analytical and experimental work on turbulent gas-particle flows. He is much remembered for his classic wind tunnel experiments in the 1980s on the dispersion of small particles in grid-generated turbulence. These were carried out in the presence of an electric field that controlled the drift velocity of the particles and allowed the influence of the particles’ *crossing trajectories* to be varied without changing the influence of the inertia. This meant that the two effects could be studied independently of one another. The experimental results for the dispersion and the particle rms velocity were in perfect agreement with theoretical predictions, and the method has been extensively used by others to calibrate and validate the numerical simulation results. These experiments are an enduring testament to Dave’s remarkable skills and versatility as an experimenter.

Dave also contributed to the development of several numerical methods for the modeling of dispersed particulate flows. With his colleague Clayton Crowe, he participated in the early development of the numerical method known as the “particle-source in cell” model (PIC model), one of the very first numerical models for dispersed multiphase flows. He and his students used pseudo-turbulence models, generated by Fourier modes, to quantify the Lagrangian statistics of inertial particles. The Lagrangian correlation time measured along a particle trajectory, known as the Wang–Stock correlation, was later used by many others including commercial software to improve the modeling of inertial particle dispersion. He also made contributions to two analytical studies on particulate dispersion: the first rigorous analysis of particle-velocity correlation times in different stochastic trajectory models; and the modeling of particulate turbulent dispersion coefficients considering both particle inertia and gravity. His research work and numerous publications were recognized by the ASME, when he was named the recipient of the *Freeman Scholar Award* in 1994.

Dave Stock was a very good mentor and a life-long friend to his students. He had a unique and warm smile, spoke in low and soft tones, was a good listener, and loved to praise others—attributes that made him approachable to all students. He exposed his students to latest research developments, respected them, and encouraged them to try their own ideas. He made sure to celebrate every success of his graduate students: when doctoral students successfully defended their dissertation research, they could count on a huge party, at Dave’s house in the small town of Albion, WA. As a thoughtful mentor, he introduced his students to many of his friends and the academic culture, something that benefited

them in building their research careers. Several of his former doctoral students have pursued very successful academic careers.

Dave contributed a great deal to the Fluids Engineering Division. He joined the then “Polyphase Flow Committee” in the early 1980’s; he was instrumental in the renaming of this Committee to the current “Multiphase Flow Committee” and served as its chair in the late 1980s. He was the founding chair of the long series of ASME symposia, the Gas-Solids Symposium series, and he made certain that the symposia attracted the best researchers in the area from all over the world. All of us are benefited by participating in these remarkable scientific events. He was a member of the executive committee of the Fluids Engineering Division and chaired the Division in 2000. He was also very helpful in the success of the International Conference on Multiphase Flow (ICMF) having served as the chair of the ICMF Scientific Committee in 1998 and then helping with the collocation of the ICMF and FEDSM in New Orleans, an event that attracted more than 1200 scientists and engineers in 2001. He and his wife, Molly, spent the last ten years in retirement in their two homes in Washington State and Argentina.

Dave Stock was indeed a unique and special human being and we all share with his family and friends their great sense of loss.

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