

In Memoriam



Subhash C. Sinha

Dr. Subhash C. Sinha, Alumni Professor Emeritus of Auburn University, Auburn, AL, and Founding Editor of the ASME *Journal of Computational and Nonlinear Dynamics*, passed away on June 10, 2019, at age 71 in his home in Auburn after battling with idiopathic pulmonary fibrosis over the past several years. The communities of nonlinear dynamics, vibration and control, and applied mechanics have lost a premier engineer, researcher,

and scholar, who has been extraordinarily influential in these fields for over four decades. Some of us have also lost a trusted advisor, mentor, and friend.

Professor Sinha was born in Bihar, India. He graduated with a B.S. degree from Bihar Institute of Technology in 1968, an M.S. degree from the Indian Institute of Science, Bangalore in 1972, and a Ph.D. degree from Wayne State University in 1977, each degree in Mechanical Engineering. His academic career started in 1977 as an Assistant Professor at Kansas State University. In 1985, he moved to the State University of New York at Binghamton, and in 1987, he moved a final time and started his long association with Auburn University where he was an Associate Professor and Professor in the Department of Mechanical Engineering and Director of the Nonlinear Systems Research Laboratory until his retirement in 2016. He held the Philpott–Westpoint Stevens Distinguished Professorship in the Samuel Ginn College of Engineering at Auburn University between 2002 and 2005 and he was an Alumni Professor since 2009. Professor Sinha was a dedicated teacher and taught undergraduate and graduate classes in dynamic systems, vibrations, control, and machine dynamics. Professor Sinha advised or co-advised 15 Ph.D. students, six of whom also went into academic careers, and two dozen M.S. students. In recognition of his teaching accomplishments, he was awarded the *Walker Teaching Merit Award* in 2009. During his career at Auburn, Professor Sinha was also a visiting professor at INSA, Lyon, France, and at the University of Mauritius, where he was a *Fulbright Lecturer/Researcher* in 2007–2008.

Dr. Sinha was a Life Fellow of ASME, a member of SAE, AAM, Sigma Xi, and an Associate Fellow of AIAA. He helped to organize several symposia and conferences in the general area of dynamics and vibrations and served as the General Chair of the 1999 ASME IDETC and Chair of the 17th Biennial Conference on Mechanical Vibration and Noise in Las Vegas, NV, and Conference Chair of the 6th International Conference on Multibody Systems, Nonlinear Dynamics, and Control in 2007. Dr. Sinha served as the Chair of the ASME Applied Mechanics Division Committee on Dynamics of Structures and Systems from 1989 to 1993 and as the Chair, Vice-Chair, and Secretary of the Technical Committee on Vibration and Sound between 1994 and 2000. He also served as the Chair of the ASME Design Engineering Division Executive Committee, was a member of the Publication Committee of ASME, and was the Chair and a Founding Member of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics at its creation in 2003. He served as Associate Technical Editor for the ASME *Journal of Vibration and Acoustics* and served on editorial boards for several other journals in the field. As the Founding Editor of the ASME *Journal of Computational and Nonlinear Dynamics* (for which the inaugural issue appeared in September 2005), he guided that journal in its infancy through

the end of 2010 with enthusiasm and wisdom. Dr. Sinha received the *N. O. Myklestad Award* of ASME (given for a major innovative contribution in vibration engineering) in 2009, the *Robert E. Abbott Award* of ASME (awarded for valued services on behalf of the Division, Society, and the Engineering Profession) in 2010, and ASME's *Dedicated Service Award* in 2012.

Professor Sinha's research specialty was in the dynamics, vibration, and control of nonlinear and time-varying dynamical systems, which he helped to develop in great depth. Together with his students, Dr. Sinha developed innovative techniques for the dynamic analysis of parametrically excited systems, including periodically loaded structures and rotating systems such as rotor-bearing systems and helicopter blades. These developments constitute a set of analytical, symbolic, and numerical techniques that have been applied to the analysis and control of a large variety of linear and nonlinear periodic systems, including chaotic systems such as cardiac dynamics. With these strategies, one can remove the small-parameter assumption inherent in the perturbation and averaging techniques, and hence, be able to apply them to systems with strong parametric excitation. Floquet theory, Chebyshev polynomial expansion, and the Lyapunov-Floquet transformation were key tools in this work, in which a wide range of other analytical techniques such as normal forms, nonlinear normal modes, center manifold theory, versal deformations, stochastic stability, and various control methodologies were also utilized. Professor Sinha recognized the importance of and need for these mathematical tools for the analysis and control of dynamical systems with periodically varying parameters, and his work was characterized by a complete understanding of all aspects of a problem and careful attention to detail in all phases of the solution.

As a teacher, mentor, and colleague, Prof. Sinha was generous with his time and wisdom to those who asked for help. While he was not liberal in giving out praise to others, Prof. Sinha would always have a few words of encouragement for his students, who certainly benefited from his high expectations as well as from the rigor which infused his writing and lectures. At times, he was magnanimous in his commendation of others as exemplified by the warm and touching memoriams he wrote for two colleagues from the nonlinear dynamics community (Ross Evan-Iwanowski and Vinod J. Modi). Prof. Sinha's interests outside of engineering also reflected his deep intelligence and sensitivity. He was a very talented photographer, and he took many beautiful photographs during trips to Chile, New Zealand, Iceland, and other destinations shortly before and after his retirement. In former days, he was a talented table tennis player and challenged many of his students to games (he was never defeated). Dr. Sinha was also a huge fan of professional tennis, had a great interest in jazz and classical Indian music, and had admiration and respect for a wide range of human achievements.

All told, Professor Sinha was a remarkable individual who leaves behind a legacy of scholarship and impact. He has without a doubt been one of the most influential scholars in the area of time-varying dynamical systems. His dedicated and selfless service to ASME over the years has had a major impact in the profession and on the field of nonlinear dynamics in particular. His careful mentorship of his students has resulted in many successful engineering and academic careers and has certainly touched many lives for the better. His life will continue to inspire many generations to come. He was a brilliant scientist, a distinguished teacher, an inspiring advisor and mentor, and a truly wonderful human being. He will be deeply missed by all.

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