

Timoshenko Medal

GRIGORY ISAAKOVICH BARENBLATT

*Conferral at the Applied Mechanics Dinner,
2005 International Mechanical Engineering Congress and Exposition*

THE TIMOSHENKO MEDAL was established in 1957 and is conferred annually in recognition of distinguished contributions to the field of applied mechanics. Instituted by the Applied Mechanics Division, it honors Stephen P. Timoshenko, world-renowned authority in the field, and it commemorates his contributions as author and teacher.

GRIGORY ISAAKOVICH BARENBLATT, Ph.D., professor in residence, department of mathematics, University of California at Berkeley; and mathematician, Lawrence Berkeley National Laboratory, California, *for seminal contributions to nearly every area of solid and fluid mechanics, including fracture mechanics, turbulence, stratified flows, flames, flow in porous media, and the theory and application of intermediate asymptotics.*

Dr. Barenblatt is one of the most notable of today's applied mechanicians. His research has enriched an enormously wide range of areas and his influence ranges from the individuals he has mentored, the peers he has challenged and enlightened and the audiences he has enthralled to the wide world of workers in engineering, the physical sciences and mathematics who have read and mastered his enormous output of research publications.

Since 1997, Barenblatt has been professor in residence in the department of mathematics at the University of California at Berkeley and mathematician at the Lawrence Berkeley National Laboratory, California. In 1992, while still a Russian resident, he was selected as the first G.I. Taylor professor of fluid mechanics at the University of Cambridge, U.K., and is now professor emeritus. His prior positions include research and senior research scientist (1953-61) at the Institute of Petroleum, USSR Academy of Sciences; head of the department of plasticity (1961-75) at the Institute of Mechanics, Moscow University; and head of the theoretical department (1975-92), Institute of Oceanology, USSR Academy of Sciences. He has held visiting professorships around the world, including the Université de Paris VI, Pierre et Marie Curie; the University of Rome 'Tor Vergata'; the Universidad Autonoma de Madrid, Spain; the University of Minnesota, Minneapolis; the University of Illinois at Urbana-Champaign; and Stanford University, California, where he was the S.P. Timoshenko visiting professor.

Barenblatt has made significant contributions in many areas of solid mechanics, particularly the area of fracture mechanics. He created mathematical structures that enable him to model many aspects of the creation and propagation of cracks in elastic bodies, as well as fatigue fracture and damage accumulation. He is particularly famous for his cohesive zone model of crack formation and its application to materials fatigue.

In fluid mechanics, Barenblatt's main contributions have been concerned with flow in porous media and with the theory of turbulence. He has formulated a basic model for flow in fissured porous rocks and has used it to solve a number of important problems involving the flow of both liquids and gases. These problems involve unsteady single-phase flow as well as those that involve two phases, such as water-oil displacement. His work on fundamental scaling laws for turbulent shear flows, in particular for pipe and boundary-layer flows, has provided the impetus for much recent work, both theoretical and experimental, in this most basic area of turbulence. He is also known for his work on the suppression of turbulence by particulate suspensions and, most recently, his seminal work on wall-bounded turbulent shear flows.

Barenblatt is the author/co-author of over 200 papers, many of which introduced an important new concept into the field of mechanics, developed a new and novel mathematical model or initiated a line of investigation of major significance for the direction of applied mechanics research or the practice of mechanical engineering. His book, *Scaling, Self-similarity, and Intermediate Asymptotics* (Cambridge University Press, 1996), covers a breadth of topics, including combustion and detonation, fracture, flow in porous media, geophysical fluid dynamics, fractals and the renormalization group to name just a few. He is also an exceptional speaker and has presented plenary invited lectures and opening/closing lectures at major national and international meetings. He has served, most recently, as a member of the editorial boards of the *International Journal of Fracture*; the *European Journal of Mechanics – B/Fluids*; *Transport in Porous Media*; *Mechanics: Research Communications*; and the *International Journal of Engineering Mathematics*.

Barenblatt is a foreign member of the Royal Society of London, a foreign associate of the National Academy of Sciences and the National Academy of Engineering, an honorary member of the American Academy of Arts and Sciences, and a member of Academia Europaea, among others.

His honors include the Modesto Panetti Prize and Medal (1995) from the Accademia della Scienze di Torino; the J.L. Lagrange Medal (1995) from the Accademia Nazionale dei Lincei; the J.C. Maxwell Medal and Prize (1999) from the International Congress for Industrial and Applied Mathematics; and the G.I. Taylor Medal (1999) from the American Society of Engineering Science.

Barenblatt earned his bachelor's degree, Ph.D. and D.Sc. in mechanics and mathematics at Moscow University in 1950, 1953 and 1957, respectively. In 1993, he earned the title master of arts at Cambridge University. He holds a doctor of technology (1989), honoris causa, from the Royal Institute of Technology (Stockholm, Sweden); and a doctor of civil engineering (2005), honoris causa, from Polytechnic Institute of Turin, Italy, among others.