

A BRIEF APPRAISAL OF PROFESSOR ADRIAN BEJAN WORK



This special issue of the Journal Thermal Science comprises some of the papers presented in the “Gabrovo International Symposium of Thermal-Fluid Science and Engineering” dedicated to Professor Adrian Bejan, during his Doctor Honoris Causa Ceremony in Gabrovo, Bulgaria on April 5-6, 2004. An exception only is the paper of Seculic and Sankara.

Professor Adrian Bejan is an outstanding academic personality and world-renown scientist, chiefly known for his capacity in conceiving and building innovative knowledge. His is J. A. Jones Distinguished Professor of Mechanical Engineering in Pratt School of Engineering at Duke University (North Carolina, USA) and one of the one hundred most cited authors in the area of engineering. Born in 1948 in Galati (Romania), he received his bachelor’s and master’s degrees in Mechanical Engineering at the Massachusetts Institute of Technology in 1972, where in 1975 he also received his doctorate. Professor Adrian Bejan’s research work spans a wide variety of thermal engineering topics: the minimization of entropy generation, exergetic analysis, natural convection, combined heat and mass transfer, convection in porous media, turbulence, scale analysis, *etc.* More recently, he developed the Constructal Theory of Form and Structure in Nature.

Professor Adrian Bejan is the author of 17 books on engineering, energy, and environmental topics, and the author of more than 400 scientific articles. He is a part of the editorial board or is an editor for 21 international journals. He is a member of several scientific societies, receiving numerous honors from many of them. He holds 14 honorary doctorates from prestigious universities outside of the United States.

Professor Adrian Bejan is distinguished as much by the great originality and versatility of his scientific work, widely renowned and praised, as by his exceptional didactic aptitude, repeatedly illustrated in his academic textbooks, several of them serving as primary references texts for engineering studies throughout the world. Much of the contents of his textbooks resulting from his abundant and innovative research work, Adrian Bejan conveys in them the imaginative approach of a exceptional researcher.

He has attracted the attention of the scientific community in recent years as the author of the Constructal Theory, in which the relationship between form and structure in engineering and form and structure in nature is discovered. The optimization of the overall functioning of systems subjected to constraints has been identified as the essential principle in the generation of form and structure in both natural and artificial systems with internal fluid circulation. The geometric structures that result from the application of this principle in engineering are called constructs. The recognition that the same principle is the basis for the generation of the shape of systems with internal fluid circulation, whether living or inanimate, led to the thesis of Constructal Theory, whose most recent

developments were systematized in his book *Shape and Structure, from Engineering to Nature* (Cambridge University Press, 2000). In addition to engineering, this theory has since revealed its inquisitive and explanatory potential in other areas, such as biology and medicine (allometric laws, structure of the respiratory and circulatory systems, body rhythms, organ and tissue structures), and earth science (circulation of planetary fluids, structures of river basins, *etc.*). It also reveals some promising developments in social sciences.

Since 1998 Professor Adrian Bejan has maintained a close relationship with the Gabrovo Technical University, Bulgaria, a relationship for which we feel greatly honored. Our University highly appreciates the generous availability and the continued collaboration of Professor Adrian Bejan not only in terms of scientific research but also in terms of the promotion of conditions affirming this University as a nationally-renown centre for engineering studies with international recognition.

Considering Professor Adrian Bejan's highly relevant contributions to the general progress of scientific knowledge with his academic pursuits of inspiring and vast interdisciplinary repercussions, as well as his distinguishing this University with his valuable collaboration, the Academic Board of the University unanimously approved conferring to Professor Adrian Bejan an Honorary Doctorate from the Technical University of Gabrovo. The honorary degree was awarded in solemn academic plenary section on the April 5, 2004. In addition to this academic tribute to Professor Adrian Bejan as an eminent scientist and world authority in mechanical and thermal engineering, the Technical University of Gabrovo organized two days Symposium on "Thermal-Fluid Science and Engineering" which was held on April 5-6, 2004, with invited speakers: Sylvie Lorente (INSA, France), Antonio Miguel and A. Heitor Reis (University of Evora, Portugal), Eden Mamut and Rita Avram (Ovidius University of Constance, Romania), Tatiana Morosuk and Boris Kosoy (Odessa State Academy of Refrigeration, Ukraine), Vladimir Nikulshin (Odessa National Polytechnic University, Ukraine), Jordan Hristov (University of Chemical Technology and Metallurgy, Sofia, Bulgaria), Veneta Grigorova (Technical University of Varna, Bulgaria), Ventsislav Zimparov (Gabrovo Technical University, Bulgaria), and Adrian Bejan himself.

In the present volume we collect some of the papers offered by our speakers. An additional and very special contribution to this issue is the paper of Dusan Seculic (University of Kentucky, USA), who, unfortunately, was not be able to participate the Symposium. His paper is a tribute to the thermodynamics concepts prominently promoted over the years by professor Bejan. We greatly acknowledge his willing to join us, and the efforts he has done to prepare his paper in due term.

We feel that in bringing them to a wider audience, the Technical University of Gabrovo is also contributing to making the ideas of Professor Adrian Bejan more widely known so it might inspire further researchers in a growing number of fields of knowledge.

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