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PREFACE: NEW TRENDS IN THE THERMOMECHANICAL MODELING OF SOLIDS

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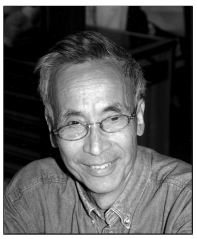
This special issue of JoMMS contains some contributions presented at the *International Conference on Thermo-Mechanical Modeling of Solids* organized by the Laboratoire de Mécanique des Solides (LMS) of the École Polytechnique, Paris, in July 2007.

The LMS was founded in 1961 jointly by Professors Jean Mandel and Pierre Habib as a mechanics research center bringing together researchers from the École Polytechnique, the École des Mines, the École Nationale des Ponts et Chaussées and the Centre National de la Recherche Scientifique (CNRS).

Professor Jean Mandel (1907–1982) graduated from the École Polytechnique in 1927 with highest honors, allowing him to join the prestigious Corps des Mines. His academic career started at the École des Mines of Saint-Étienne in 1932, and continued at the École des Mines of Paris in 1948. From 1951 to 1973 Mandel was a professor of mechanics at the École Polytechnique, where he held the prestigious chair occupied by Lagrange, Cauchy and Poisson. He is well known for his contributions to continuum mechanics, most notably in viscoelasticity, plasticity and geomechanics. His influence extended far beyond his research fields: at the École Polytechnique and in the LMS, several generations of researchers have been shaped by close interaction with Jean Mandel.

The conference was an occasion for the LMS to honor our colleagues Huy Duong Bui, Ky Dang Van, Minh Phuong Luong, Jean Salençon and Joseph Zarka, who started their scientific careers at the LMS in the sixties.

Huy Duong Bui graduated from the École Polytechnique in 1959 and obtained his Doctorat d'État in 1969. His contributions in plasticity and fracture mechanics were crucial for the safety assessment of structures in the nuclear industry. His favorite topic has always been duality. He extended the duality scheme from elasticity to plasticity and further to fracture mechanics [Bui 1978; 2006], and was the first to give the dual expression of the energy release rate in terms of the J-integral. In the field of inverse problems he proposed a series of methods and closed-form solutions based on the reciprocity gap [Bui 1973], which serves as a measure of the loss of duality. Bui is the author of several books and a member





From left to right: Huy Duong Bui, Ky Dang Van, Minh Phong Luong, Jean Salençon and Joseph Zarka.

of the French Academy of Sciences, the European Academy of Sciences and the French Academy of Technology.

Ky Dang Van graduated from the Ecole Nationale des Ponts et Chaussées and obtained a Doctorat d'État in 1971. His contribution to fatigue theory which is based on a multiscale analysis of the materials at the grain size level and on the concept of shakedown. His what is broadly known as the Dang–Van criterion which is an efficient procedure to estimate the life-time of structures [Fayard et al. 1996; Ballard et al. 1995; Dang Van and Maitournam 1993]. The Dang Van criterion has since been adopted in a variety of companies in the automotive and the aerospace industries. His scientific impact has been recognized by many awards including the Wallenberg prize of the Swedish Academy of Engineering the Alexandre Darracq prize of the French Academy of Science and the Silver Medal of the CNRS.

Minh Phong Luong is a graduate of the École Nationale des Ponts et Chaussées and obtained his Doctorat d'État in 1964. His area of competence is geomechanics and geotechnical engineering, with a special emphasis in earthquake engineering. He made important contributions to granular materials [Evesque et al. 1993] and developed a novel technique for the prediction of lifetime using using infrared thermography [Luong 1995; 1998]. He has several notable results in nondestructive testing of engineering materials. His contributions were patented and used in various industrial applications. He is a recipient of the Henri Courbot prize of the French Academy of Science and several other awards from professional associations.

Jean Salençon graduated with high honors from École Polytechnique in 1959, which allowed him to join the prestigious Corps des Ponts et Chaussées. He obtained his Doctorat d'État in 1969. One of his major contributions is the the reformulation of yield design using the sophisticated mathematical convexity theory. His results were used in the formulation of standards and computational codes broadly used in civil engineering. His other research interests lie in earthquake engineering. Professor and Head of the Department of Mechanics at École Polytechnique and École Nationale des Ponts et Chaussées for years, Salençon is well known his extraordinary classes in different disciplines of mechanics [Salençon 1980; 2001; 2005; 2009]. He is currently the president of the French Academy of Science, and a member of the Istituto Lombardo (Milan).

Joseph Zarka graduated from École Polytechnique in 1962 and obtained his Doctorat d'État in 1968. His main contributions are in multiscale aspects of the polycrystalline plasticity and in the numerical analysis of inelastic structures, including the development of fast algorithms [Zarka et al. 1990]. His other contributions are in optimization techniques and in the domain of nondestructive testing. His current research interests are centered on the optimal design of materials and structures based on automatic learning including applications in areas such as control of fabrication and survey of structures. He was honored by the French Academy of Science with the Fourneyron prize and by the Swedish Academy of Engineering with the Wallenberg prize.

The present generation of LMS researchers is mostly composed of the students and collaborators of Huy Duong Bui, Ky Dang Van, Minh Phuong Luong, Jean Salençon, and Joseph Zarka. Their presence is constantly felt in the LMS because of the high standards of scholarship and intellectual honesty they transmitted to all of us.

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