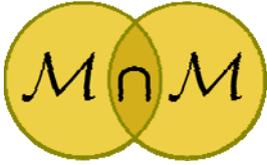


*International Research Center on*  
**MATHEMATICS AND MECHANICS OF**  
**COMPLEX SYSTEMS**



*and*



**FONDAZIONE TULLIO LEVI CIVITA**

**FÉLIX DARVE**

Félix Darve is the author of more than 200 papers. His contribution has been primarily directed to the goal of establishing the basis of geomechanics, academic discipline of which he was among the founders in an international scale, in the early '80s. The Geomechanics is now a discipline of broad interest and the subject of several international journals and several series of international conferences. The geomechanics aims to apply the tools and methods of mechanics to the study of soils, rocks and cement, grouped under the general category of "geomaterials" because of the many features that distinguish them from solid materials.

Félix Darve was born on 1947. He graduated in engineering from the Ecole Centrale in Paris in July 1971, he defended his Ph.D. in the University of Grenoble in 1974 and the Doctorat des Sciences in 1978 in the field of numerical modeling of geomaterials. He began his academic career as an assistant at the University of Grenoble, and then as maitre-assistant at the Institut Polytechnique of Grenoble. In 1985 he was appointed professor and he received in 1998 the promotion to the exceptional class from the Comité National des Universités.

During his career, Félix Darve covered positions of great responsibility both locally and nationally. He founded and directed the Groupement de Recherches Coordonnées (GRECO) "Géomatériaux" of the CNRS (Centre National des Recherches) from 1986 to 1993. The GRECO, with its 250 members, contributed to organize and finance the French research in geomechanics. From 1987 to 1992 he directed the Ecole Nationale Supérieure de Mécanique et d'Hydraulique of Grenoble. In 1989, he founded the network of "European laboratories' ALERT Geomaterials", where he covered the chair of president until 2011. This Network of Excellence is today, together with its 25 laboratories, a point of reference for the geomechanics European community. ALERT has contributed to the beginning of a European school of thought in the field of geomechanics. From 1992 to 1995 he was Deputy Director of the Department at the French Ministry of Research that is responsible for monitoring all laboratories in the areas of solid mechanics, civil engineering and mechanical engineering. Félix Darve

has chaired numerous scientific committees, evaluation committees, and research facilities. He serves as an expert in international organizations.

As for his editorial responsibilities, in addition to its participation as a member of the editorial board of several international journals (Granular Matter, Computers and Geotechnics, CRAS Mécanique, MeMOCS, ...), he founded the "European Journal for Environmental and Civil Engineering" (EJECE, Taylor and Francis, indexed on ISI WoS) and "Mechanics of Cohesive-Frictional Materials"(MCFM, Wiley), which subsequently merged with the "International Journal for Numerical and Analytical Methods in Geomechanics" (IJNAMG, Wiley). It is currently one of the editors-in-chief of IJNAMG. In addition, Félix Darve was co-author of 14 books (Elsevier, Balkema, Hermes, Lavoisier, ...). He is the author, with J. Berthier, of a report to the French Minister of Research.

The damage in geo-materials often occurs due to the formation of slip bands in which the plastic deformation concentrates, or due to fractures, especially of the type microcracking. Since 1976, F. Darve has recognized the importance of applying in geomechanics the concepts of bifurcation of deformation modes, with the aim of studying the localization of deformation or the damage. The application of the criterion of localization for incremental non-linear laws (for which original mathematical studies were necessary) has led, among other results, to the explanation of the experimental evidence that the localization precedes the failure in dense geo-materials. In the case of loose soil, experiments show the presence of diffuse failure modes without localization. The "liquefaction" of loose sand saturated with water in the event of an earthquake is the most spectacular example. These failure modes remained for a long time without explanation, in the sense that they did not satisfy both the criteria of plasticity for geomaterials nor the criteria of the location. It follows that landslides in low slope and torrential mudflows (sometimes devastating: 161 dead in Italy in 1998), cannot be described by these criteria. In 1987, Félix Darve found a material instability criterion that was applicable in these situations: the stability condition of Hill - Mandel, linked to the sign of the second order work. The introduction of these concepts has been very successful, as they are now internationally used to describe diffuse failure. This set of concepts and tools has allowed to completely rethink the notions of fracture and mechanical instability in non-viscous solids in a wider and more rational context, including for instance avalanches of grains in discrete mechanics.

Natural hazards have been, until recently, treated with empirical methods. The development of tools and methods for describing the mechanical behavior of nonassociated and triphasic geo-materials allow to better model and understand these natural phenomena and to forecast them in order to intervene with appropriate consolidation works. In domains where multi-scale and multi-phase aspects play a central role, the School of geo-mechanics of Grenoble occupies a leading position internationally.

The committee, entrusted by the  
**“Fondazione Levi-Civita”**

and the Scientific Committee of the  
**International Research Center MEMOCS**

with the responsibility of awarding the  
**International Levi-Civita Prize**

unanimously propose Professor Félix Darve as winner of the 2012 edition.