## Mixed Methods in Solid Mechanics with Large Deformations

Javier Bonet<sup>1</sup>

<sup>1</sup> College of Engineering Swansea University Singleton Park Swansea UNITED KINGDOM

## ABSTRACT

The presentation will describe recent advances in the use of mixed methods in solid mechanics where the variables are the geometry of the problem over a set of kinematic variables as the deformation gradient tensor, his adjacent and its determinant elements. In the static case, a series of mixed variational principles are proposed to impose equilibrium and the compatibility equations between the main variables. These principles include the Hu-Washizu and Hellinger-Ressner types.

In the dynamic case, equilibrium and compatibility are imposed based on a series of first order hyperbolic conservation equations, similar to those used in fluid mechanics, which allows the use of stabilization methodologies as SUPG and VMS. The presentation will include a series of examples demonstrating the advantages of the proposed methodology.