

# A FREE-DISCONTINUITY MODEL FOR VOID GROWTH AND COALESCENCE IN NONLINEAR ELASTICITY

Duvan Henao

Facultad de Matemáticas,  
Pontificia Universidad Católica de Chile,  
Av. Vicuña Mackenna 4860. Macul, Santiago, Chile

## ABSTRACT :

A unified framework for cavitation and classical fracture is presented, with a view towards the nucleation of cracks in polymers and ductile materials. Cavitation is modelled by the appearance of point singularities in the minimization of a polyconvex energy with slow growth at infinity, while codimension-one fractures are represented by jump discontinuities of the deformation. So as to allow for both type of discontinuities, and to give the elastic body the freedom to fracture the way it prefers, deformations are only required to be special functions of bounded variation in order to be considered admissible, as in the Mumford-Shah model for image segmentation in visual computing. Both analytical and numerical results will be discussed, which are joint work with Carlos Mora-Corral and Xianmin Xu.