

6 Research Activity

Research Interests: Broad field of computational mechanics. Constitutive modelling of materials: materials with internal structure, metamaterials, biomaterials. Biomechanics of soft tissues. Frictional contact mechanics. Cohesive, energy and variational approaches to fracture mechanics. Space and time discretization methods. Mesh-adaption algorithms for finite elements.

	Items	Total Citx	Without Self Citx	H-Index	I10-Index	Average Citx/Item
ISI-WOS	88	3,091	2,821	26	52	35.13
Scopus	99	3,505	3,219	27	47	34.6
Google Scholar	189	5,186	-	32	57	40.4

Table 1: Bibliographic metrics in popular scientific databases, Apr 2020. Citx = citations

Here, specific research topics are linked to the corresponding publications, honorary presentations (denoted with H), seminar presentation (denoted with S), international conference presentations (denoted with P) and Italian conference presentations (denoted with N), listed in the following.

Specific Research Topics

1. Hydraulic fracture in non conventional reservoirs, numerical modeling and permeability evolution predictions.
2. Metaconcrete: a new concept of concrete with enhancing performance aggregates.
3. Biomechanics of active biotissues: constitutive models for the electro-mechanics of cardiac excitation; polymeric heart valve prosthesis theoretical development, numerical modeling, and prototype design.
4. Biomechanics of fiber reinforced tissues: constitutive models for biological tissues with distributed orientation of the reinforcing collagen fibers.
5. Meshfree methods: approximation approaches for transport and fracture propagation problems.
6. Eigenerosion: modeling quasistatic fracture propagation with provably convergent energy based criteria.
7. Complex materials: field induced phase transition in nematic liquid crystals.
8. Biomechanics of arterial walls: modeling fracture in anisotropic biological tissues and application to plaque rupture in diseased human arteries.
9. Biomechanics of the cornea: modeling refractive surgery procedures, linking mechanics and optics in normal and pathological conditions, characterization of the mechanical properties of porcine corneas and validation of numerical models of the cornea.
10. Constitutive modeling of elastomeric materials: mechanical behavior of fluidic microvalves and UV radiation sensitive materials for ophthalmologic applications
11. Fracture in structures: extension of standard cohesive approaches to fracture in thin shells and in anisotropic plates.
12. Constitutive modeling of soils: Cam-clay plasticity and multiscale brittle damage.
13. Dynamic fracture: sensitivity to the dynamic load speed and duration on crash processes, and on the propagation of fracture in delamination in composites.

14. Contact mechanics: non-smooth frictionless and frictional contact algorithms and application to dynamical problems of fracture and fragmentation in biomechanics and soil mechanics.
15. Crack tracking: mesh adaptivity algorithms for finite element discretized three-dimensional solids.
16. Cohesive models of fracture in finite deformations and application to failure under dynamic loading: modeling brittle and fatigue failure.
17. Geomechanics: analytical solutions for the identification of the in situ stress state, numerical methods for the identification of soil material properties; numerical solutions for free seepage in porous materials.
18. Variational formulation and numerical solutions of the elastic-plastic problem.
19. Modeling the behavior of no-tension or pressure sensitive materials under cyclic loading; and the behavior of reinforced concrete under the action of fire.