

NOVA MECHANICA S.A.

spin off company

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Profile

NOVA MECHANICA SA, founded in 2007, is a spin-off company of CE.RE.TE.TH. (Center for Research and Technology of Thessaly). The company's fields of expertise are Mechanics, Nanotechnology, New Materials and Materials Assessment, Metrology and 'High Performance Diagnostics', Textiles - Bio textiles, Indenters and Bio-sensors.

The company's offers innovative applications related to the Designing and Development of new Complex Materials, as well as the Qualitative control of production and Lifecycle-monitoring of materials in various operation systems.

The applications address needs of the manufacturing industry, the biomedical and biotechnology industries and the developers of micro-nano electronic systems, based on the growth of new materials (functionally graded composites, high-tech textiles, semi-gels, gels) with special/specific characteristics.

Potential customers are medical equipment, diagnostic devices, pharmaceutical companies and research organisations interested in new technologies that allow material optimization possibilities through their mechanical characterization.

NOVA MECHANICA has strong international collaborations with research institutions like MIT, Royal Institute of Technology and Oxford University. The company's corporate contacts include Hysitron Corporation (Minn, USA), Continental SA, Pirelli Labs, ROSEN Swiss AG, 3M Europe, Mi PLAZA – PHILIPS.

Technology and R&D

NOVA MECHANICA is active on all aspects of Biomechanics, in the design and performance simulation of almost any biomedical system and in the analysis of existing and new Biomaterials.

The company investigates Functionally Graded Composites, materials with electromagnetic coupling effects, soft materials like gels and textured materials like textiles.

The company has developed several measuring devices and methodologies for determining mechanical properties of soft tissues, gels and food products, as well as for establishing relations between mechanical properties with chemical and physiological properties of

biomaterials. This applicable to a variety of practical problems such as tumour detection, pharmaceutical tablet strength, drug delivery, etc.

NOVA MECHANICA is currently active in three major areas:

1) Implants - Modelling potential failures and protection strategies

- Modelling of a fail-safe procedure, for titanium alloy hip prosthesis devices. The procedure is similar to what is used in aerospace technology.
- Fracture Mechanics for the life prediction of the ceramic materials used for heart valve prostheses.

2) Drug delivery - Modelling the diffusion of substances

- Modeling of the squeezing hydrogel concept, which can be used for the design of controlled drug delivery. The company has models that describe the highly non-linear deformations involved in this case.
- Modeling and predicting the release of an active agent as a function of time. The company has developed sophisticated mathematical models needed at the design level, to capture the time evolution of the diffusion-controlled drug release systems or procedures.

3) Biomedical device prototype manufacturing

- High Performance Diagnostic devices for soft, rubber-like materials (elastography of human and animal tissues, meat and dairy products quality control).
- Development of strong surfaces (high quality artificial teeth) using functionally graded composites inspired by natural teeth.
- Prototype models of grafts made of rubber-like materials.

Target partners & Collaborations

The company seeks to undertake projects in its area of expertise. Partners are sought in several fields of Biomedicine that have specific needs for optimisation of existing and developing of new designs. In particular, the pharmaceutical sector, instrumentation companies, companies manufacturing biomedical devices and diagnostic companies could benefit from partnerships with NOVA MECHANICA.

More specifically, collaborations are sought in the following areas:

- Co-development of new materials for existing and new biomedical products
- Measurements of the mechanical properties of existing or new materials used in biomedical products
- Correlation of mechanical properties with other physiological properties of bio-materials
- Optimisation of the shapes of existing bio-devices to achieve better functionality, less weight and low cost
- Design of shapes for new bio-devices
- Modelling diffusion and flow of substances in the human body for drug delivery systems
- Manufacturing of prototypes of new devices