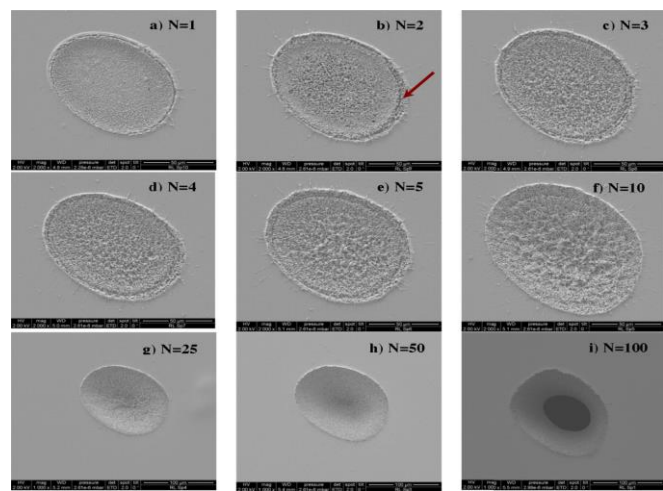
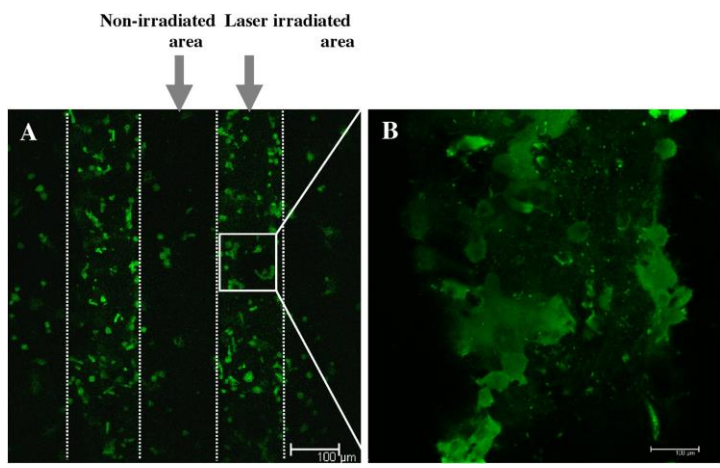


- **Complete denomination:** Institute of Electronics –Bulgarian Academy of Sciences
- **City, country:** Sofia, Bulgaria
- **Director:** assoc. prof. Sanka Gateva
- **Contact person in NEWGEN:** Dr. Albena Daskalova
- **Working Group involvment:** WG3, WG2
- **Staff:** Dr. Irina Bliznakova, Blaga Blagoeva, Alexandra Zhelyazkova
- **Research topics:** Ultrafast Laser Micro- and Nano- Processing of biomaterials, Ultra-short laser ablation of dentin and enamel, Laser-matter-interaction
- **Researchers expertises:** Ultrafast laser microprocessing of thin films of biopolymers for tissue engineering applications, studies of laser induced surface preparation of hard dental tissue, SEM, AFM morphology examination of laser processed bio-surfaces.

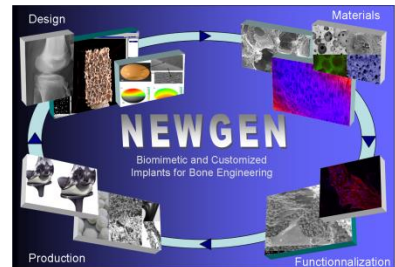
Ultrafast laser induced surface modification of thin biopolymers films for application in tissue engineering



Femtosecond laser modification is able to produce a biopolymer porous matrix that mimic in part the structure and biological function of the extracellular matrix and can be potentially used for controlling cell behaviour. It is tunable and can be used to design structures that affect cell proliferation, viability, and spreading.

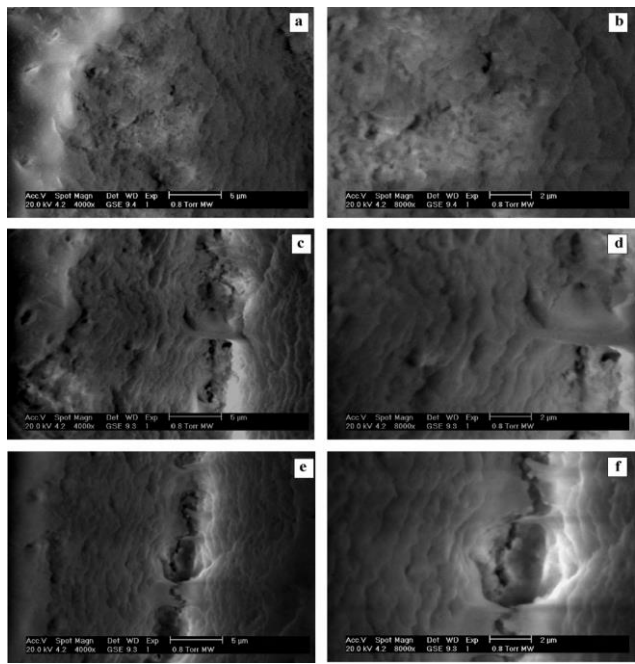


Cells adhesion on collagen–elastin laser induced porous matrix

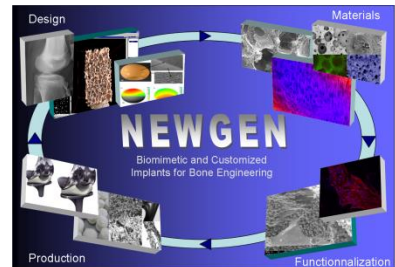
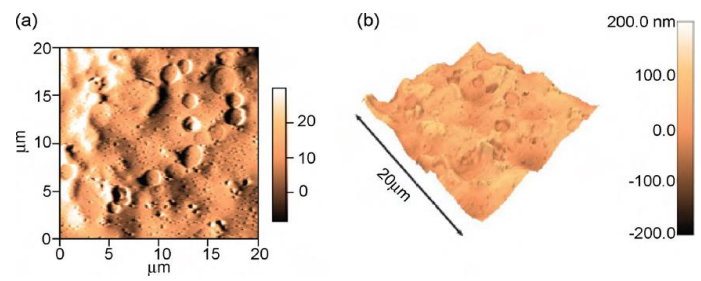
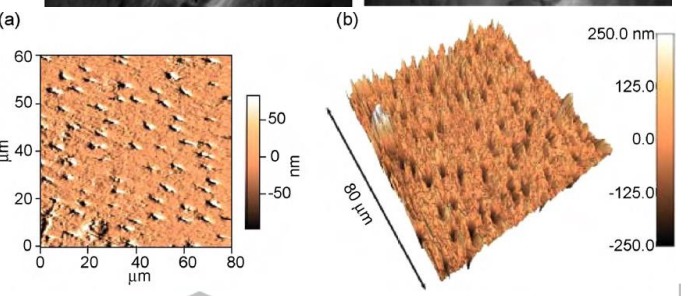


COST Action MP1301

Ultrafast lasers in dentistry



- Cavity preparation of dental hard tissues
 - Treatment of carious lesions
 - Remove ceramic from a bulk
- Cleaning and shaping of the root canal system for elimination of tissue remnants, usually this procedure was performed with hand instruments which leave a smear layer afterwards. Utilizing lasers this disadvantage can be avoided.
- Laser sealing of dentinal tubules for reducing the sensitivity to thermal stimuli.
- Recently an innovative femtosecond laser shaping (by ablation) of ceramic restorations have gained promising results in manufacturing dental crowns and bridges.
- The optimal irradiation conditions (avoiding collateral damage) can be tuned in order to achieve sealing of the dentinal tubules.



Group collaborations

- Institute of Applied Physics (IAP)- Vienna University of Technology (TU Wien), Vienna, Austria
- Femtolasers Productions GmbH – Vienna Austria
- Institute of Electronic Structure and Laser , Foundation of Research and Technology (IESL-FORTH), Heraklion, Greece
- Sofia University, “St. Kliment Ohridsky”, Non-linear Optics and Solid State Laser Laboratory

Ti-sapphire ultrashort laser (Coherent- MIRA)



- Tunable ($\lambda=700\text{nm}-900\text{nm}$) femtosecond, 80MHz, $\tau=150\text{fs}$, KLM modelocked Ti: Sapphire laser oscillator
- module for SHG, $\lambda=400\text{nm}$



- LIBS system



FluoroLog 3 system (HORIBA Jobin Yvon)

- Xe-lamp (200-650 nm),
- Scanning double monochromators
- PMT detector with high performance in the region 200-800 nm;
- fiber-optic module - F-3000 with fiber optic probe - 1950-1M-fluorescent properties of solid samples which can not be put in a standard cuvette

