**ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ**
**ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ ΥΛΙΚΩΝ**

**ΠΡΟΣ**

1) **Ολα τα μέλη ΔΕΠ του Τμήματος Επιστήμης και Τεχνολογίας Υλικών**
2) **Τους εκπροσώπους των Μεταπτυχιακών φοιτητών του Τ.Ε.ΤΥ**

3) **Την Επταμελή Εξεταστική Επιτροπή**
4) **Ολα τα μέλη της Πανεπιστημιακής Κοινότητας**

**Πρόσκληση σε Δημόσια Παρουσίαση της Διδακτορικής Διατριβής του**

**κ. Κασσώτακη Εμμανουήλ**

(Σύμφωνα με το άρθρο 12 του Ν. 2083/92)

Την Τετάρτη 15 Φεβρουαρίου 2012 και ώρα 11:00 στην αίθουσα Σεμιναρίων 3ου ορόφου-Φυσικό

θα γίνει η δημόσια παρουσίαση και υποστήριξη της Διδακτορικής Διατριβής του υποψηφίου διδάκτορος του Τμήματος Επιστήμης και Τεχνολογίας Υλικών κ. **Κασσωτάκη Εμμανουήλ** με θέμα:

# «Σχεδιασμός και Μελέτη Σύνθετων Πεπτιδικών Βιοϋλικών»
# "Design and Study of Peptide composite biomaterials"


ABSTRACT

The present PhD thesis is focused on the 'Design and study of peptide composite biomaterials". Self-assembling peptides are supramolecular entities that spontaneously form from elementary building blocks, held together with non-covalent interactions. Introduction of biological self-assembly principles in the field of biomaterial and nanoscale engineering, is relatively recent and many avenues still remain to be explored. A major advantage in the assembly of biological materials is their self-assembly from building blocks, under non-aggressive conditions such as ambient temperatures and aqueous environments, and the good interface that exists

between organic and inorganic phases. Another important feature in biological materials and especially proteins is the possibility of tailored-made modifications that can be made at the sequence level in order to confer functionalities on the self-assembled scaffolds. These modifications cover a wide range and can include change of amino acids, incorporation of non-natural amino acids, and chemical modifications.

The present thesis is focused on self-assembling octapeptides, made up from building blocks found in natural proteins. The aim of the project is to investigate minimal amino acid modifications for designing peptides that maintain their self-assembling ability intact and are able to anchor inorganic materials on their surface.

The first part focuses on templating biosilica on the surface of the fibrils and the role of serine (SER (S)) residues is investigated in the templating of silica precursors. In the second part two-dimensional films are constructed and through thiolated peptides, quantum dot nanoparticles are deposited on the surface of the films. The third part reports the laser photocrosslinking of the formed assemblies, mediated by the introduction of crosslinkable aromatic residues. The final chapter focuses on a different self-assembling system and describes the synthesis of peptide-porphyrin hybrid materials with photoelectronic properties.

Overall the thesis reports how a single self-assembling building block can be modified by rational choice of amino acids in order to be targeted for different functionalities.