

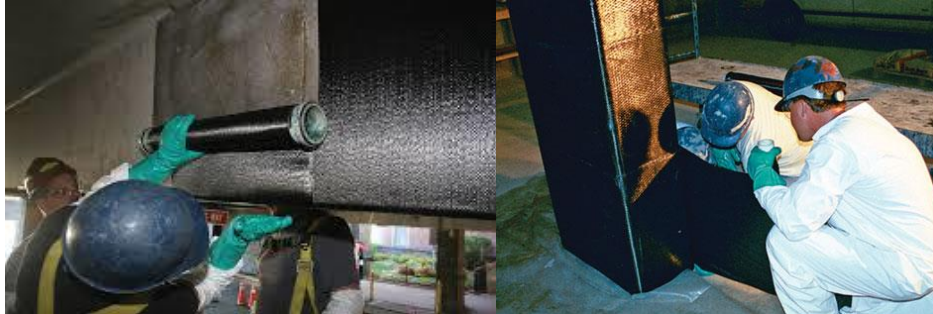


UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

**DICEA**  
DIPARTIMENTO  
DI INGEGNERIA CIVILE  
E AMBIENTALE

## AVVISO DI SEMINARIO

MARTEDI' 29 MAGGIO 2018, ore 10.30 -13.00 – Aula 206  
MERCOLEDI' 30 MAGGIO 2018, ore 11.30 -13.00 – Aula 120  
Scuola di Ingegneria, Università di Firenze  
Via di S. Marta, 3 – 50139 Firenze



### **Externally bonded composite materials for strengthening and rehabilitation of concrete structures**

**Christos G. Papakonstantinou**

Assistant Professor

Dept. of Civil Engineering, University of Thessaly, Greece

Structural rehabilitation and strengthening of existing structures is one of the most important challenges faced during the last decades by modern Civil Engineering. Traditional strengthening methods such as concrete and steel jacketing although in some cases work very well, they do have several major disadvantages. One of the most promising solutions, is a relatively new construction technique, which is based on the use of composite materials, also known as Fiber Reinforced Polymers (FRPs). These materials, which were originally developed for the aerospace industry, can be bonded externally to structural elements (beams, columns, walls, nodes, etc.), which either have been damaged by an extreme event, such as an earthquake, or have insufficient strength and/or ductility. In the first research studies, composite materials consisting of glass and/or carbon fibers impregnated with organic matrices were successfully used to increase the structural capacity of members such as beams, columns and slabs. These composite materials contributed significantly to the flexural and shear strength of structural elements mainly due to their high strength. Research has shown that these materials can significantly increase the flexural and shear strength as well as the compressive strength of the concrete by means of confinement, without adding much load to the structure. During the last decade, even more composite materials consisting of different fibers and matrices have been developed and tested.

The first lecture will include a description of all available composite materials that can be used for repairs and strengthening with an emphasis on their physical and mechanical properties.

The second lecture will contain information on their specific use, as well as some design guidelines for flexural and shear design.

**Christos G. Papakonstantinou** is Assistant Professor and Director of the Concrete Technology and Reinforced Concrete Structures Laboratory at the Department of Civil Engineering, University of Thessaly, Volos, Greece. He received a PhD in Civil and Environmental Engineering in 2003 from Rutgers University, NJ, USA. He also holds a MSc degree in Civil Engineering from the University of South Carolina, USA, and a Civil Engineering Diploma from Aristotle University of Thessaloniki, Greece.

He previously worked as Assistant and Associate Professor at the University of Massachusetts, Dartmouth, and as Faculty of Engineering at Higher Colleges of Technology/Abu Dhabi Men's College. He has published more than 40 research articles with more than 700 citations. His research interests include: composite materials, structural rehabilitation, concrete technology and reinforced concrete structures. Prof. Papakonstantinou is a member of ACI, ASCE and GSCE.