



Department of Civil Engineering Seminar

Innovative inorganic-matrix composites for strengthening of existing concrete and masonry structures: theory and application

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**Friday September 6, 2019, Bingham Room 240, 11:30-12:30PM,
Lunch in Structures Lab, after seminar**

Abstract: Fiber-reinforced composites are increasingly used in civil engineering structure applications for strengthening and rehabilitation of reinforced concrete (RC) and masonry structures. They represent a sustainable alternative to new construction because they allow for an extension of the original service life, preventing the demolition of existing structures. Among them, fiber-reinforced polymer (FRP) composites gained a large popularity in the last few decades due to their high-strength-to-weight ratio and ease of application. However, the use of organic matrices in FRP is responsible for some drawbacks, such as the low resistance to (relatively) high temperatures and poor compatibility with concrete and masonry substrates. To overcome these issues, inorganic-matrix composites comprising high-strength fiber textiles embedded within a cement- or a lime-based matrix have been proposed. These composites, generally referred to as fabric-reinforced cementitious matrix (FRCM) composites, showed promising results as externally bonded reinforcement of RC and masonry members. Various experimental tests were proposed to investigate the mechanical properties of FRCM composites and of the FRCM-strengthened member and the results obtained were used as the basis for analytical and numerical design models. This seminar provides a brief overview on the most recent development in experimental, analytical, and numerical investigation of these inorganic-matrix composites.



Tommaso D'Antino is an Assistant Professor at the Department of Architecture, Built Environment, and Construction Engineering of Politecnico di Milano, Italy. He was Visiting Scholar at Missouri University of Science and Technology (Rolla, MO, USA) from September 2012 to May 2013 and Early Stage Researcher (Marie Curie fellowship) at the University of Patras (Greece) from March 2014 to September 2015. He is a member of Rilem TC 250-CSM (Composites for the Sustainable Strengthening of Masonry), Rilem TC 234-DUC (Design procedures for the use of composites in strengthening of reinforced concrete structures), Rilem TC-IMC (Durability of Inorganic Matrix Composites used for Strengthening of Masonry Constructions) and fib TG 5.1 (FRP reinforcement for concrete structures). He is also a member of the Editorial Board of the Journal of Composites for

Construction (ASCE) and of the Advisory Board of Structural Concrete (fib). His research interests include the study of the behavior of reinforced and plain concrete and masonry elements strengthened with fiber reinforced organic (FRP) and inorganic (FRCM) composites.