



CASE SCHOOL
OF ENGINEERING

CASE WESTERN RESERVE
UNIVERSITY

Department of Civil Engineering

Case Western Reserve University
Bingham Bldg. Room 208
10900 Euclid Ave
Cleveland, OH 44106

Department of Civil Engineering Seminar
**ADVANCED CEMENT-BASED COMPOSITES: AN ASSET FOR CIVIL
ENGINEERING TO FACE THE XXI CENTURY SOCIETAL AND
ECONOMICAL CHALLENGES:**
The approach of the H2020 Project “ReSHEALience”.

Prof. Liberato Ferrara
Politecnico di Milano – Italy

Friday, October 25, 2019
Vose Room 11:00 am – 12:00 pm

More than one century after its massive introduction in the building industry, concrete is still the most popular building material. Nevertheless, several critical infrastructures (especially those in the marine environment) show severe signs of distress. This fact fostered, in recent years, the need of rethinking the design process of concrete structures, in view of reducing maintenance costs and extending their service life. In the framework of H2020, the European Commission has funded the project ReSHEALience. The main idea behind the project is that the long-term behaviour of structures under extremely aggressive exposure conditions can highly benefit from the use of high performance materials, in the framework of durability-based design approaches. The project consortium, coordinated by Politecnico di Milano, features 14 partners from 8 different countries, including 6 academic/research institutions and 8 industrial partners, covering the whole value chain from producers of concrete constituents to construction companies to stake-holders and end-users. The main goals of the project are the development (a) of an Ultra High Durability Concrete (UHDC) and (b) a Durability Assessment-based Design (DAD) methodology to improve structure durability and predict long-term performance under Extremely Aggressive Exposures (EAE). The project will tailor the composition of UHDC, by upgrading the UHPC/UHPFRC concept through the incorporation of tailored nanoscale constituents focusing, among the others, on stimulating the autogeneous self-healing capacity. The development of an innovative material calls for an extension of the available consolidated experimental methods to validate its durability in service conditions, and also for building adequate theoretical models to evaluate ageing and degradation of UHDC structures and therefore to accurately predict the lifespan. New design concepts will be proposed and validated through long-term monitoring in six full-scale proofs-of concept, selected as representative of cutting edge economy sectors, such as green energy, blue growth and conservation of R/C heritage.

Liberato Ferrara is associate professor of Structural Analysis and Design and holds the Italian National qualification to full professor. He has been Fulbright visiting scholar at the Center for Advanced Cement Based Materials, Northwestern University, IL, USA and is visiting professor at Beijing Jiaotong University, PRC. He is the coordinator of H2020 project ReSHEALience and has been responsible of the PoliMi research group in two EU-FP7 projects, and coordinated bilateral scientific cooperation projects with South Korea, India, Israel and Italy. He is involved in technology transfer, through collaborations with major industrial partners in Italy and has served as consultant for public institutions and private engineering and construction companies, also in the field of large scale projects. He is currently chair of the American Concrete Institute (ACI) TC 544-Fiber Reinforced Concrete and co-chair of *fib* (Federation Internationale du beton) Task Group 4.3-Design with highly flowable concretes as well as member of several ACI, RILEM and fib Technical Committees. He has served in international scientific conference committees, as editorial consultant for Springer and reviewer for international journals and for different research foundations worldwide. Author of more than 50 peer-reviewed journal papers, 3 book chapters and more than 200 conference papers and co-editor of 1 book on sustainable cement based materials (Springer, June 2017), he has given seminar talks in about 40 universities worldwide, has (co)supervised 4 PhD students and has served in 10 PhD defense committees in Italy and abroad.