ROMA TRE
UNIVERSITÀ DEGLI STUDI

Seminar on

digital concrete opportunities and challenges

Prof. Robert J. Flatt

ETH ZURICH

The seminar will be held at Roma Tre University
Department of Engineering - via Vito Volterra, 60, Rome

Thursday 13 June 2019, Seminar Room at 16:00

digital concrete: opportunities and challenges

Synopsis Digital fabrication has been termed the “third industrial revolution” and promises to revolutionize the construction industry with the potential of freeform architecture, less material waste, reduced construction costs, and increased worker safety. The primary advantages of digital fabrication – freeform architecture and precision material placement – can be combined with the additional advantages of increased construction speed, reduced costs for labor and formwork, and increased worker safety. Additionally, digital fabrication is expected to lead to more sustainable construction due to more efficient structural design by placing material only where it is needed, reducing waste generation due to more efficient construction techniques, especially with respect to formwork. With this in mind, major challenges and recent advantages in the field will be reviewed examining recent developments. A major conclusion is that for the concrete technologist, material placement, hydration control, and implementation of reinforcement remain major research problems, while the formation of cold joints and the impact on durability is an open question. To close, it is essential to point out the importance of interdisciplinary research. Digital fabrication with concrete will require the intense collaboration of architects, materials scientists, roboticists, and structural engineers, among others. Major advancements in digital concrete can only occur when each party brings the constraints imposed by their respective fields to the table, and a realizable solution is put forth.

Robert J. Flatt is Professor for Physical Chemistry of Building Materials at ETH Zürich since 2010. Before that he was Principal Scientist at Sika Technology AG for 8.5 years and postdoctoral researcher at the Princeton University for 2.5 years. He owns a master in Chemical Engineering and a PhD from EPFL (Switzerland).

A main research topic is the working mechanisms of chemical admixtures. On this front, he is laying the scientific basic for the molecular design of compounds that reduce the environmental footprint of concrete. An additional area of intensive research is digital fabrication with concrete. This activity is developed with this Swiss National Competence Centre on Digital Fabrication in Architecture for which Prof. Flatt is currently Deputy Director.

Recently, Prof. Flatt co-edited the book “Science and Technology of Concrete Admixtures” with Prof. Pierre-Claude Aïticn. He has also received several awards including the 2016 *Swiss Technology Award*, two *Concrete Innovation Awards* (2014, 2017), the *RILEM Medal* and the *Sandmeyer Award* from the Swiss Chemical Society for outstanding contribution to industrial and applied chemistry. He was recently elected *Fellow of the American Ceramic Society*.