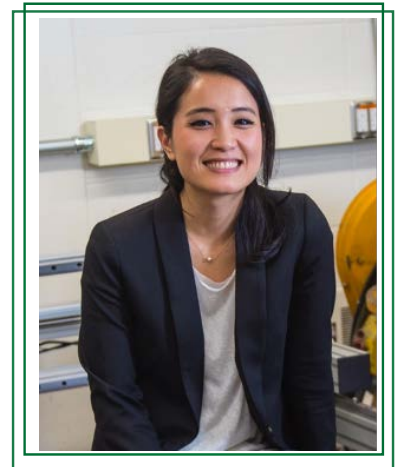


research seminar via ZOOM

Controlling the Structural Build-up of Fresh Cement Pastes Through the Use of Admixtures

Abstract: Due to the complex nature of cementitious materials, structural build-up is a function of both reversible structural changes from the thixotropic phenomena and irreversible structural changes due to hydration mechanisms. And recently, interest in this behavior has grown significantly due to the development of new processing techniques, first highly flowable concretes (i.e. self-consolidating concrete or SCC) and more recently 3D concrete printing, which require highly tailored flow and solidification behavior while the material is in the fresh state. This talk will review how structural build-up can be measured via shear rheology as elasticity and yield stress evolution, and will highlight some work on how chemical and mineral admixtures can be used to control this behavior. Admixtures will include viscosity modifying agents, nanoclays, and their combination. In addition to ordinary Portland cement systems, these admixtures were found to be effective in tailoring the rheology of reactive MgO pastes, which gain strength through carbonation curing to make them 3D printable. Casting MgO paste via 3D printing led to improved CO₂ intake and strength gain compared to conventional formwork casting.

Biographical Sketch: Shiho Kawashima is an Associate Professor of Civil Engineering and Engineering Mechanics at Columbia University. She specializes in cement and concrete rheology, with a focus on characterization techniques to probe the viscoelastic properties of fresh cementitious systems. She is also interested in nanocomposites and sustainable infrastructure materials. Kawashima received an NSF Career Award on the topic of 3D concrete printing in 2017 and the ACerS Early Career Award in 2022. She is an active member of ACI technical committees, including 236 Material Science, 238 Workability of Fresh Concrete, 241 Nanotechnology, and 564 3D Printing, as well as the ACerS Cements Division. Kawashima received her B.S. in Civil Engineering and Engineering Mechanics at Columbia University, and her M.S. and Ph.D. in Structural Engineering and Materials at Northwestern University. She joined Columbia University as an Assistant Professor in 2013.



Dr. Shiho Kawashima

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Monday, November 14, 2022

Time: 1:00 pm cst

Zoom Meeting ID:

623 695 1084

Passcode: 616495

[Link to join the Seminar](#)