



SIERA Group 2020 Seminar Series – Seminar No. 25

Wednesday, October 14, 2020 @ 5:30pm Pacific Time (PT)

Will Graphene-Cement Composites be the Next Generation of Construction Materials for Infrastructure?



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Prof. Panesar's research activities are focused on the sustainability and durability of cement-based materials and structures with application to underground, nuclear, transportation and building structures. She is involved in national and international technical, scientific and code committees for example: Chair of CSA-N287.5 (since 2010); SMiRT Co-Chair Division 1- Mechanics of Materials (since 2011); Member IC-IMPACTS Research Management Committee (since 2013); Member RILEM Technical Activities Committee (since 2018); editorial board member for Cement and Concrete Composites (since 2013), and is an associate editor of Canadian Journal of Civil Engineering (since 2018). Panesar has received honours including: P.L. Pratley Award (2007); Early Researcher Award by the Ministry of Economic Development and Innovation (2013-2018), and an Early Career Erwin Edward Hart Professorship (2016-2019) for her scholarship and exemplary graduate student mentorship.

Abstract: Graphene is a one atomic thick two-dimensional carbon-based nanomaterial with exceptional mechanical, electrical, and thermal properties. Its discovery in 2004 led to the 2010 Nobel Prize and the emergence of a new class of 2D materials. Graphene can be functionalized at a molecular level and applied to a wide range of multifunctional applications including infrastructure, aerospace, transportation, and energy systems. In the case of infrastructure, graphene and its derivatives offers new opportunities in the design of cement-based composites owing to its unique planar structure, high surface area, and physico-chemical properties. This presentation highlights the (i) characterization of various forms of graphene derivatives; (ii) review of the state-of-the art, (iii) exploratory experimental research on the characterization, properties and performance of graphene-cement composites and their underlying mechanisms, and (iv) challenges and directions for further investigation.

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