MSE Seminar

Modality: In-Person

Friday, Sept. 24, 2021

Goodwin Hall 155

10:10 AM – 11:00 AM

Ebenezer O. Fanijo

Civil Engineering
Virginia Tech

"In-situ quantitative phase microscopy (QPM) as a new technique for quantitative measurement of carbon steel rebar corrosion in concrete"

The application of quantitative phase microscopy (QPM) techniques to study *in situ*, nanoscale dissolution kinetics during corrosion of carbon steel rebar is very limited. Thus, this study aims to introduce a novel QPM technique; spectral modulation interferometry (SMI) as a new method for quantitative evaluation of corrosion at the nanoscale in real-time. With the SMI, high-quality quantitative kinetic data and analyses can be obtained on the fundamental micro-and nano-structural mechanisms and initiation of steel corrosion. With a novel 3D-printed fluid cell, both *in situ* nanoscale corrosion and electrochemical monitoring are performed simultaneously. The results from the electrochemical test showed that the performance of the fluid cell could yield repeatable results. Surface topography images acquired during corrosion using the SMI deduced that the techniques can be used to further assess corrosion initiation of low carbon steel samples.

Ebenezer Fanijo is a 2nd year Ph.D. candidate in Civil Engineering at Virginia Tech working with Professor Alexander Brand. He is also undergoing a simultaneous MEng degree program in Material Science and Engineering. His research focuses on *in-situ* nanoscale quantification of carbon steel corrosion in concrete and aluminum alloy corrosion in the automobile. He received his MSc in Civil Engineering from the University of Idaho in 2019 and his BSc from Nigeria. He is a professional civil engineer and has worked with Idaho Transportation departments on different research projects involving "development and deployment of sustainable materials for civil engineering work". As part of his Ph.D. dissertation is also working on a funded project by Ford Motor Company on "the In-situ nanoscale quantification of microstructural corrosion in Al alloys".