

ChBE 995 Autumn 2009



**The William G. Lowrie Department of Chemical and Biomolecular
Engineering Graduate Program**

Cordially invites you to attend a seminar on

**Virtual Reality: Durable Superhydrophobic Coatings for Anti-
icing and Drag Reduction**

Thursday, September 24th, 11:30 a.m.

Room 207 Koffolt Labs, 140 W. 19th Avenue
Reception before the Seminar in Room 336 Koffolt Labs, at 11:00 a.m.

Di Gao

**Assistant Professor and W.K. Whiteford Faculty Fellow
Department of Chemical and Petroleum Engineering
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Abstract

Superhydrophobic surfaces are often found on leaves of plants (notably Lotus) in nature. Water on such surfaces beads up with a contact angle of greater than 150° and drips off rapidly when the surfaces are slightly inclined, while taking away powder-like contaminations. This phenomenon, which renders the surfaces “self-cleaning”, has stimulated extensive research interest in fabricating artificial superhydrophobic surfaces. These surfaces recently have also gained considerable attention for applications in anti-icing and hydrodynamic drag reduction. Despite significant advancement in both the academic research and commercialization effort, the durability issue remains a major challenge in making and commercializing artificial superhydrophobic coatings. In the 1st part of this talk, I will discuss the design principles for making durable superhydrophobic surfaces from intrinsically hydrophilic materials (i.e. how to make mechanically robust and chemically stable superhydrophobic coatings) and approaches for realizing such principles. In the 2nd part of this talk, I will present applications of our developed superhydrophobic coatings for anti-icing and hydrodynamic drag reduction. I will discuss the fundamental mechanisms and analysis underlying these applications as well as commercialization progress of the products.