



# MECHANICAL ENGINEERING

## “Nanoparticles in gaseous flames”

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**Abstract:** Flame soot formation and functional nanomaterial synthesis by flames share many common characteristics. Both involve the formation of condensed-phase materials from gases starting with vapor-phase nucleation, followed by mass and size growth through coalescence, coagulation, surface reactions and condensation of vapor species, and finally by aggregation into fractal structures, all of which occur over very short periods of time, typically a few milliseconds.

This talk will discuss features common to the formation of soot and metal oxide particles in flames. In that context, several unresolved questions about the mechanism of soot formation will be presented. We will also discuss how a long history of fundamental flame studies has helped us to advance useful concepts and applications for flame synthesis of functional nanomaterials. Applications of flame synthesis in several interesting devices will be presented to demonstrate the many advantages of flame synthesis over conventional methods of material processing.



**Hai Wang** is Professor of Mechanical Engineering at Stanford University. Prior to his current appointment, he held faculty positions at University of Southern California and University of Delaware, all in Mechanical Engineering. His formal training is however in physical chemistry, with a Ph.D. degree from Penn State. His research interests include combustion and renewable energy, homogeneous and heterogeneous reaction kinetics.

Professor Wang is a recipient of several awards, including the NSF CAREER award in 1999, distinguished paper awards in 2009 and 2015 from the Thirty-First and Thirty-Fifth International Symposia on Combustion, and a Senior Research Award from the Viterbi School of Engineering at USC in 2011.

Friday, February 6th, 2015  
11:00 am Seminar in 233 Mudd  
Lunch served at 12:00pm  
in MECE Lobby