

PURDUE FLUIDS SEMINAR SERIES

THE FLUID-STRUCTURE INTERACTION OF NANOPARTICLES

FRIDAY OCTOBER 24, 2025
SEMINAR 2:00PM-3:00PM WALC 1121
DISCUSSION 3:00PM-3:30PM WALC 1121



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Abstract

An understanding of the fluid-structure interaction of nanoparticles in Newtonian and non-Newtonian fluids is fundamental to many applications. In this talk, I will discuss three topics that explore this interaction: (1) the propulsion of nanoparticles immersed in an acoustic field; (2) use of the induced motion of nanoparticles in suspended micro-channel resonators to probe the solid-liquid boundary condition; and (3) use of the resonance properties of nanoparticles to interrogate the viscoelasticity of simple liquids.

Biography

John Sader is an applied mathematician with over 30 years of experience, specializing in collaborative research with experimentalists. He has co-authored publications with 272 collaborators from 19 countries across a broad range of fields, including fluid and solid mechanics, colloid science, plasmonics, and advanced scientific instrumentation. This includes experimental methods that are used widely in atomic force microscopy. John earned his PhD in electrical engineering from the University of New South Wales before joining the University of Melbourne in 1992 where he became Professor of Applied Mathematics. During that time, he held visiting research positions at institutions including Caltech and Trinity College Dublin. In 2022, he joined Caltech as Research Professor of Aerospace and Applied Physics. John is an elected Fellow of the Australian Academy of Science, the Australian Mathematical Society, and the Australasian Fluid Mechanics Society.