Argonne NATIONAL LABORATORY

# James Sethian

## How Are Inkjet Printers Designed, Foams Mixed, Bicycle Helmets Manufactured, and Cars Painted?

**Complex dynamics underlying industrial manufacturing depend in part on multiphase multiphysics, in which fluids and materials interact across orders-of-magnitude variations in time and space. We will discuss the mathematics, algorithms, and high-performance computing aspects of partial differential equation-based techniques for moving interfaces, including Level Set Methods, Ordered Upwind Methods, and Voronoi Implicit Interface Methods and their application to industrial modeling of how foams evolve, how electro-fluid jetting devices work, and the physics and dynamics of rotary bell spray painting across the automotive industry.**

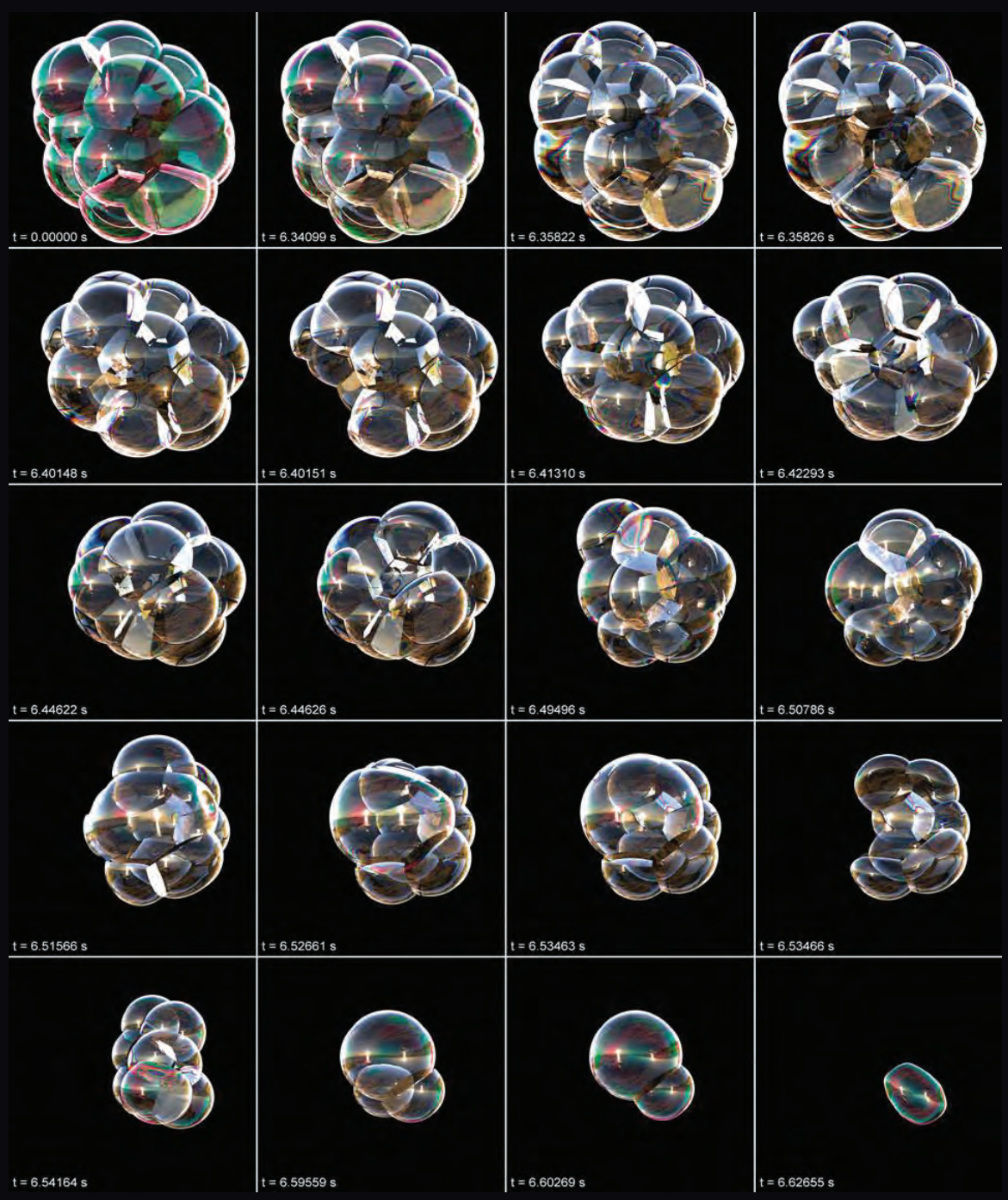


**Figure: R.I. Saye and J.A. Sethian, UC Berkeley and LBNL**

**James Sethian is Professor of Mathematics at the University of California, Berkeley, and Director of the Center for Advanced Mathematics for Energy Research Applications (CAMERA) at the Lawrence Berkeley National Laboratory, which develops new mathematical and computational techniques for analyzing data from synchrotron light sources. His research includes developing computational methods for moving interfaces, including applications to fluid mixing, semiconductor modeling, wave propagation in materials, image processing, and combustion modeling. He received his Ph.D. from the University of California, Berkeley, and his B.A. from Princeton University.**

## Wednesday, March 4, 2020 | 3:00 p.m.

Bldg. 402 | APS Auditorium
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# APS Colloquium