1046-35-9 **James Sethian*** (sethian@math.berkeley.edu), 970 Evans Hall, Department of Mathematics, University of California, Berkeley, Berkeley, CA 94720. *Advances in Advancing Interfaces: Building Semiconductors, Inkjet Plotters, Medical Scanners, and Robotic Devices.*

Propagating interfaces occur in a wide variety of settings, and include ocean waves, burning flames, and material boundaries. Less obvious boundaries are equally important, and include iso-intensity contours in images, handwritten characters, and shapes against boundaries. In addition, some static problems can be recast as advancing fronts, including robotic navigation and finding shortest paths on contorted surfaces.

One way to frame moving interfaces is to recast them as solutions to fixed domain Eulerian partial differential equations, and this has led to a collection of PDE-based techniques, including level set methods, fast marching methods, and ordered upwind methods. These techniques easily accommodate merging boundaries and the delicate 3D physics of interface motion. In many settings, they been proven valuable.

The talk is an overview of this approach, with an eye towards fundamental mathematical ideas and their geometric and algorithmic interpretation. Applications will be framed around industrial engineering collaborations which have led to robust codes for semiconductor manufacturing, inkjet plotters for building plasma displays, image segmentation and tracking in cardiac scanners, robotic navigation, and seismic imaging in oil recovery. (Received September 15, 2008)