Immaculate Collision is a series of artworks in UV gel on glass. Each is an isometric semi-transparent rendering of the computational surfaces from a regularized, inviscid, three-dimensional front-tracking vortex method. The triangulated vortex sheet surface is persistent, and locally adapts to account for extreme stretching to maintain resolution in both tangential axes. Baroclinic vorticity is generated on the surface in the Boussinesq limit. A Vortex-In-Cell method performs the vorticity-velocity inversion: circulation is interpolated from the triangular elements to the grid (and subsequent velocity at the nodes read from the grid) using a spherical Peskin function with radius $\Delta x$. Free-space boundary conditions were provided by a vortex treecode calculation on the boundary cells.

The simulations that generated these images began as three to five non-overlapping spherical regions of fluid with radii ranging from 12.8 to 76.8 $\Delta x$ and Atwood numbers of -1 or +1. The computational volume was typically $256^3$, and simulations were stopped after growing to 4M-10M elements.


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