

Boiling down Water Visualization

This poster shows an overview of water visualizations. Every water visualization can be classified as processes represented by properties, visualized by graphical features.

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Introduction

Physical aspects of water can be visualized in different ways.

This poster illustrates techniques that can be applied to water simulations in order to make certain properties and features of the water visible. Each visualization serves a certain purpose and can help gain insights into water behavior.

In the center, we illustrate nine variants to show the flow of water over a cylinder.

The upper row shows some of our own creations, while the sidebar shows illustrations that we consider particularly appealing.

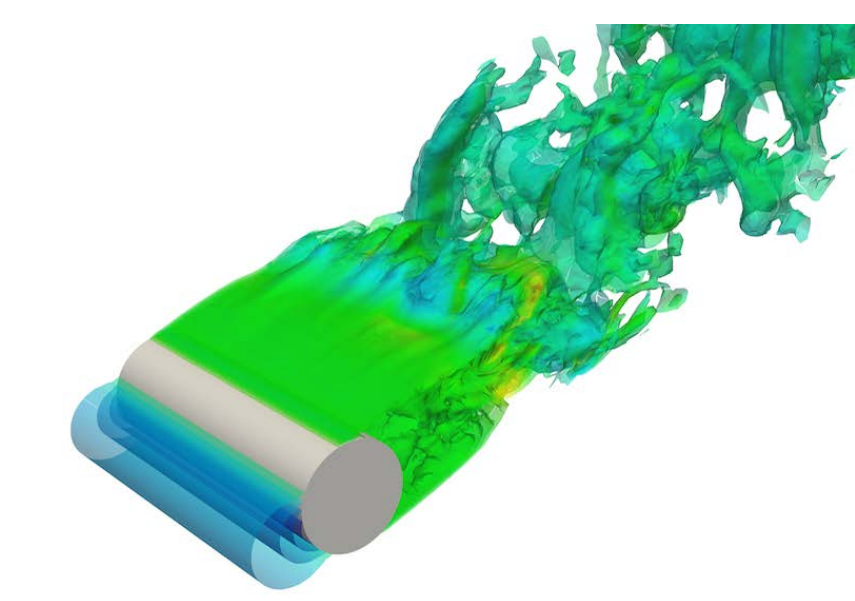
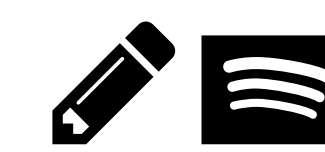
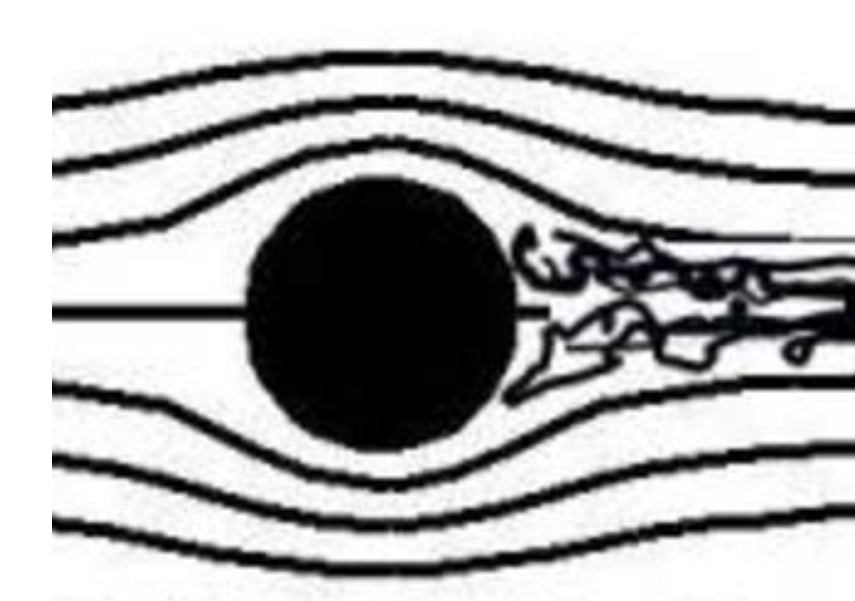
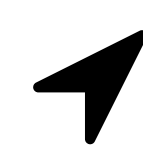
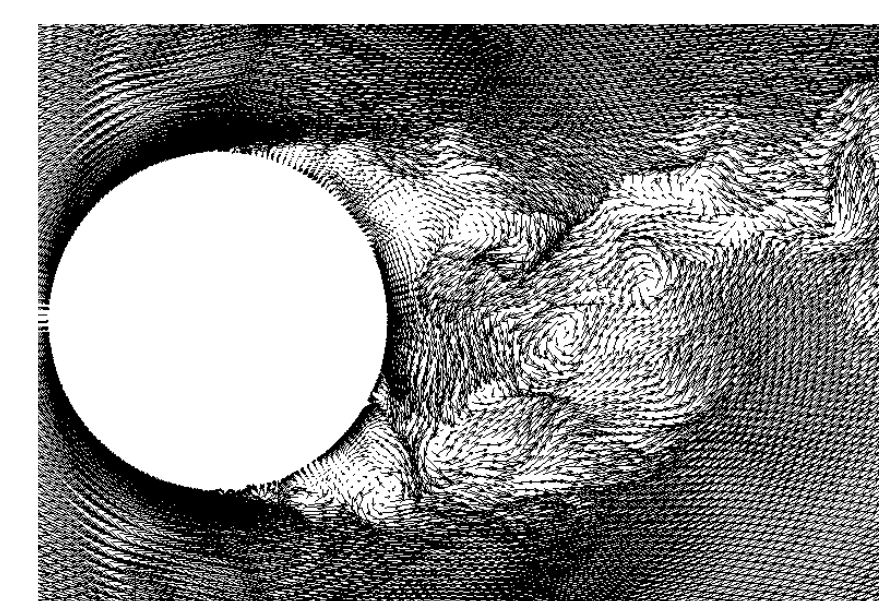
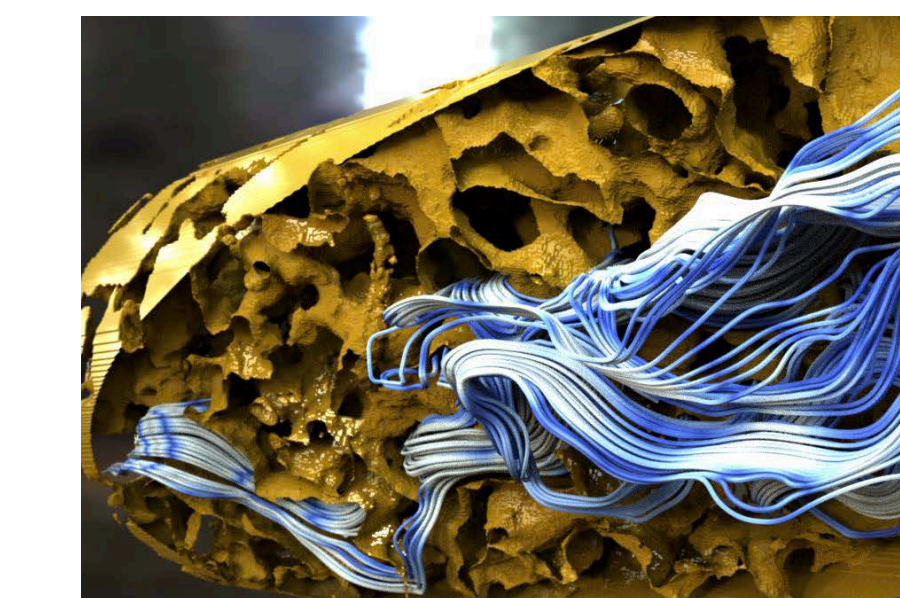
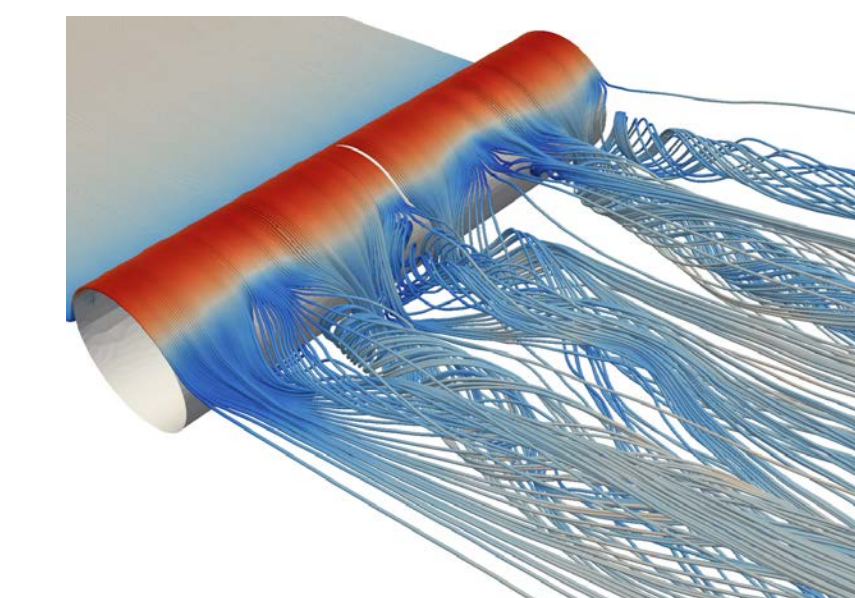
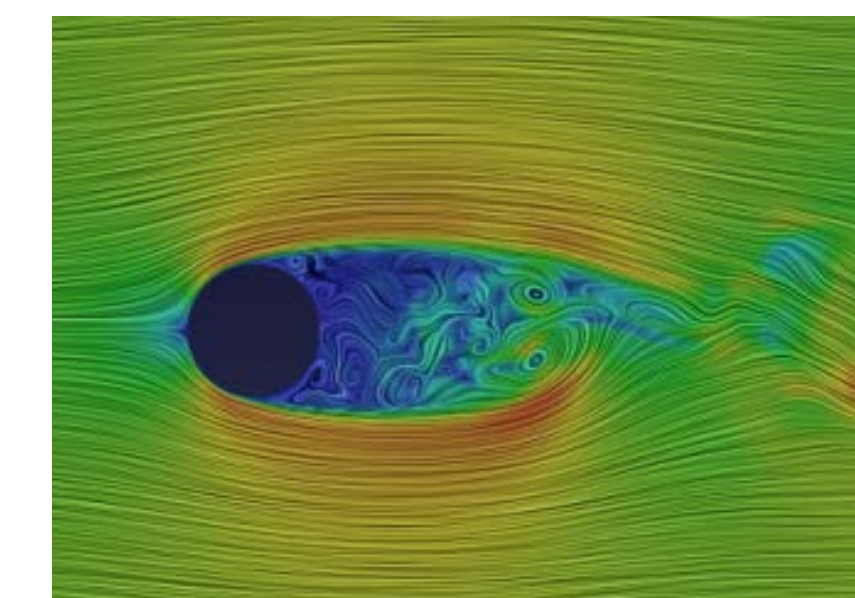
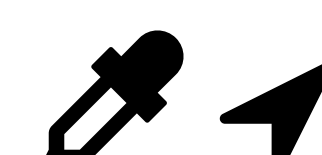
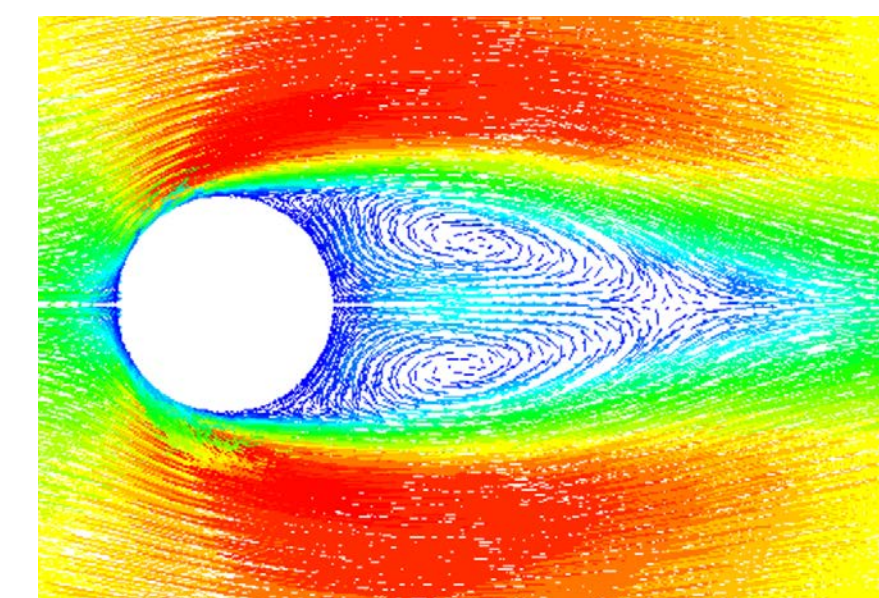
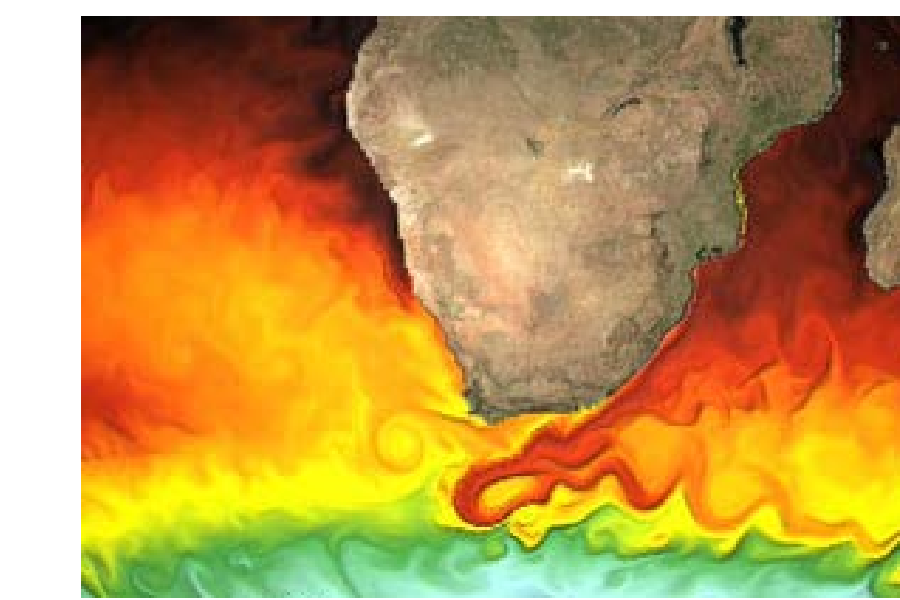
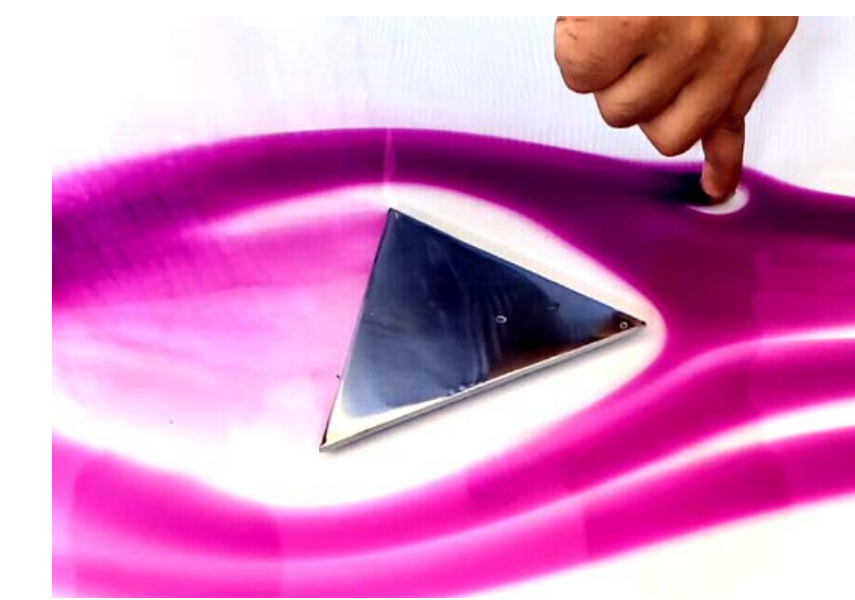
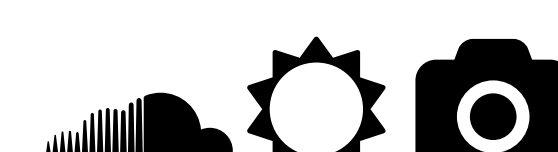
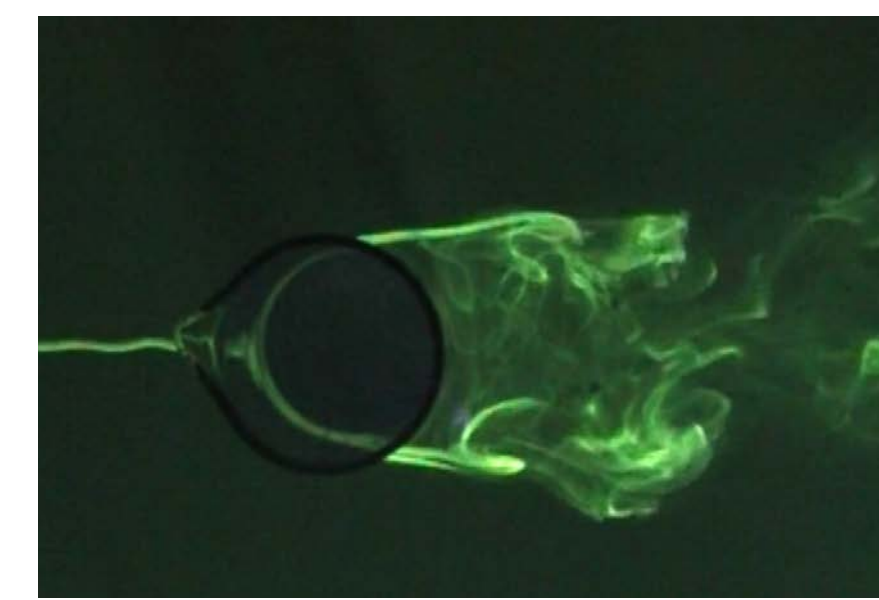
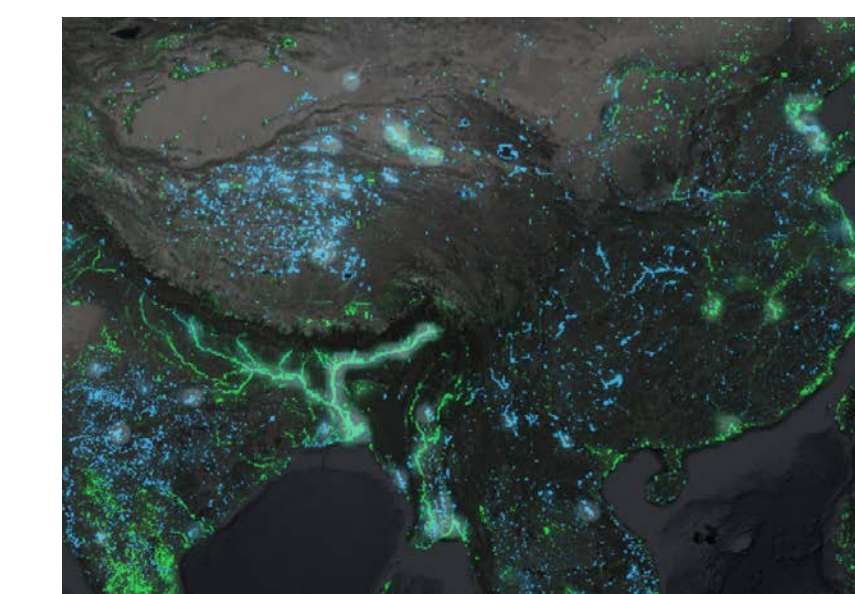
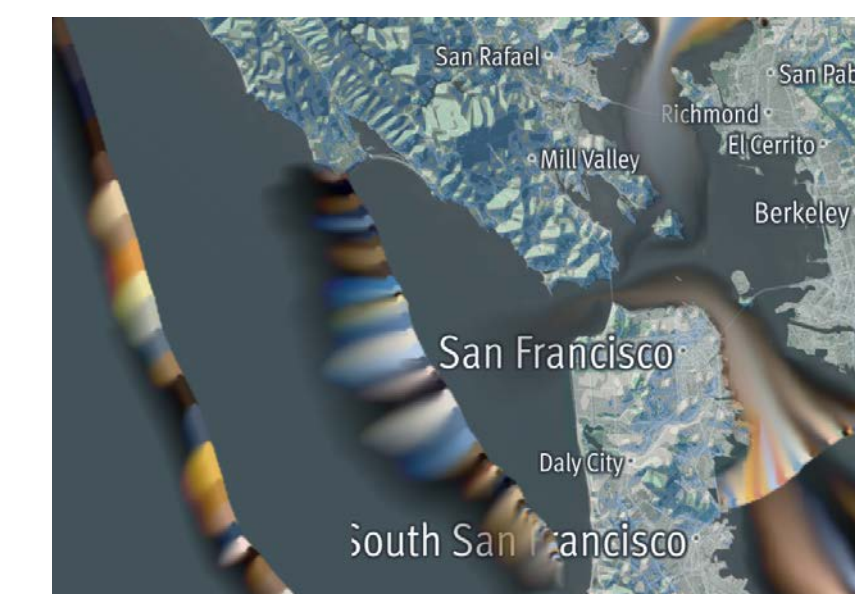
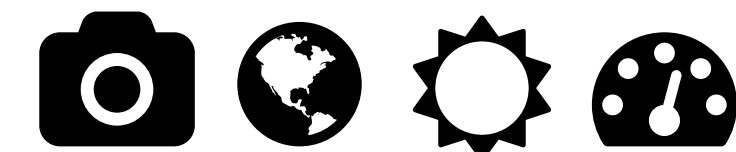
In the online version of this poster, all visualizations are clickable to access an online demonstration.

The building blocks

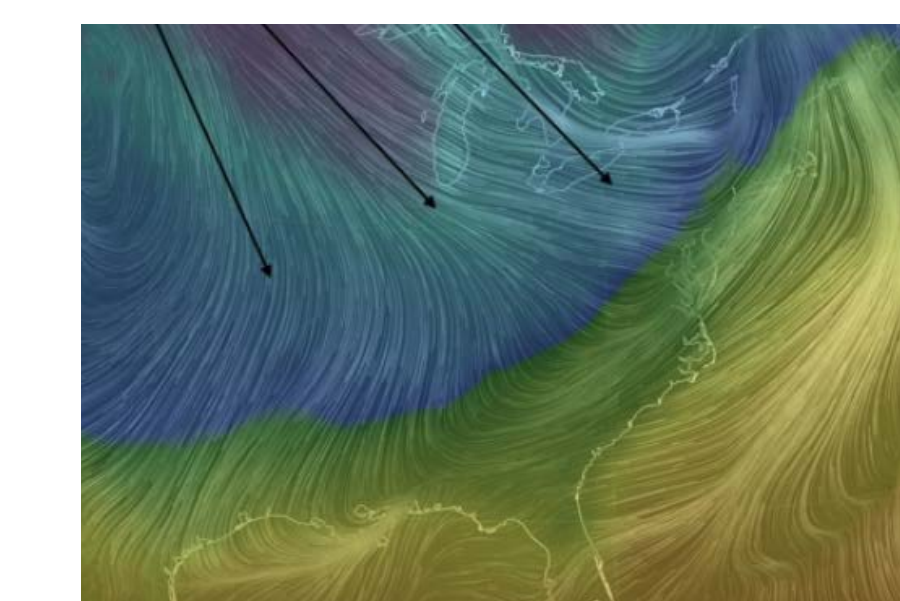
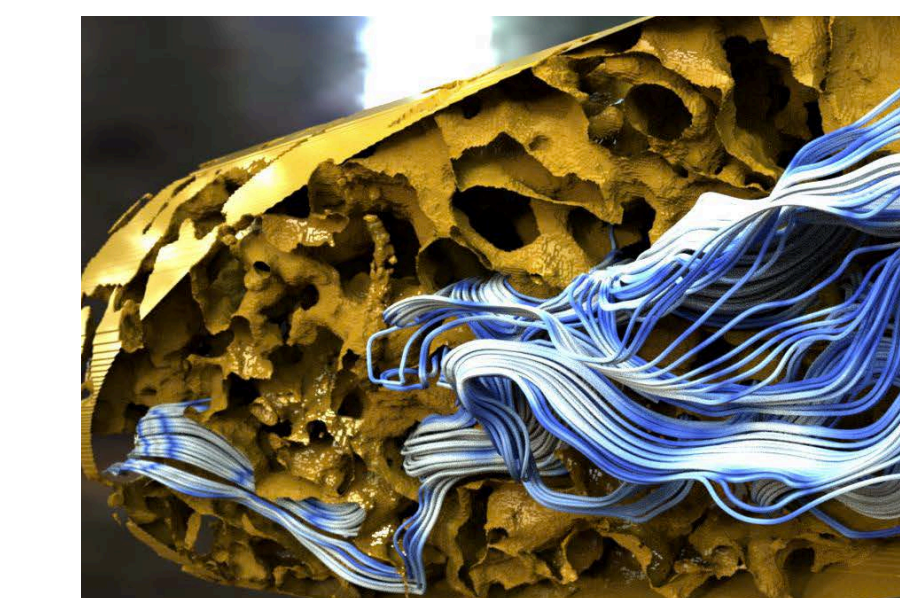
The different visualizations use geometries to represent physical processes. These processes can include barotropic and baroclinic flow, tides, surge and waves. These processes result in both internal properties (temperature, vorticity, velocity, density) external properties (depth, col-

-  photorealistic
-  lighting
-  3D context
-  2D context
-  time selection
-  interactive
-  zoomable
-  live updates
-  color by value
-  contours
-  streamlines
-  quiver
-  smoke
-  dye

Our visualizations



Visualizations of others, flow over cylinder



Work by others

or, concentration) and derived properties (topology, eddies, turbulence).

The examples combine geometries such as lines and arrows or more advanced features such as contours, stream, streak and pathlines to represent these processes. Aesthetics like hue, saturation, intensity, specularity, diffusivity and density can be used to make the visualization appear more natural or to represent. To this graphical elements can be added, such as spatial or geospatial context, interactivity, zooming and time sliding.

Conclusion

This overview shows the wide variety of graphical features to visualize water. These techniques help create more appealing, convincing and informative visualizations.

Literature

- [1] Ferwerda, J.A. (2003) Three varieties of realism in computer graphics
- [2] Wilkinson, L. (2006) The grammar of graphics
- [3] Iglesias, A. (2004) Computer graphics for water modeling and rendering: a survey

