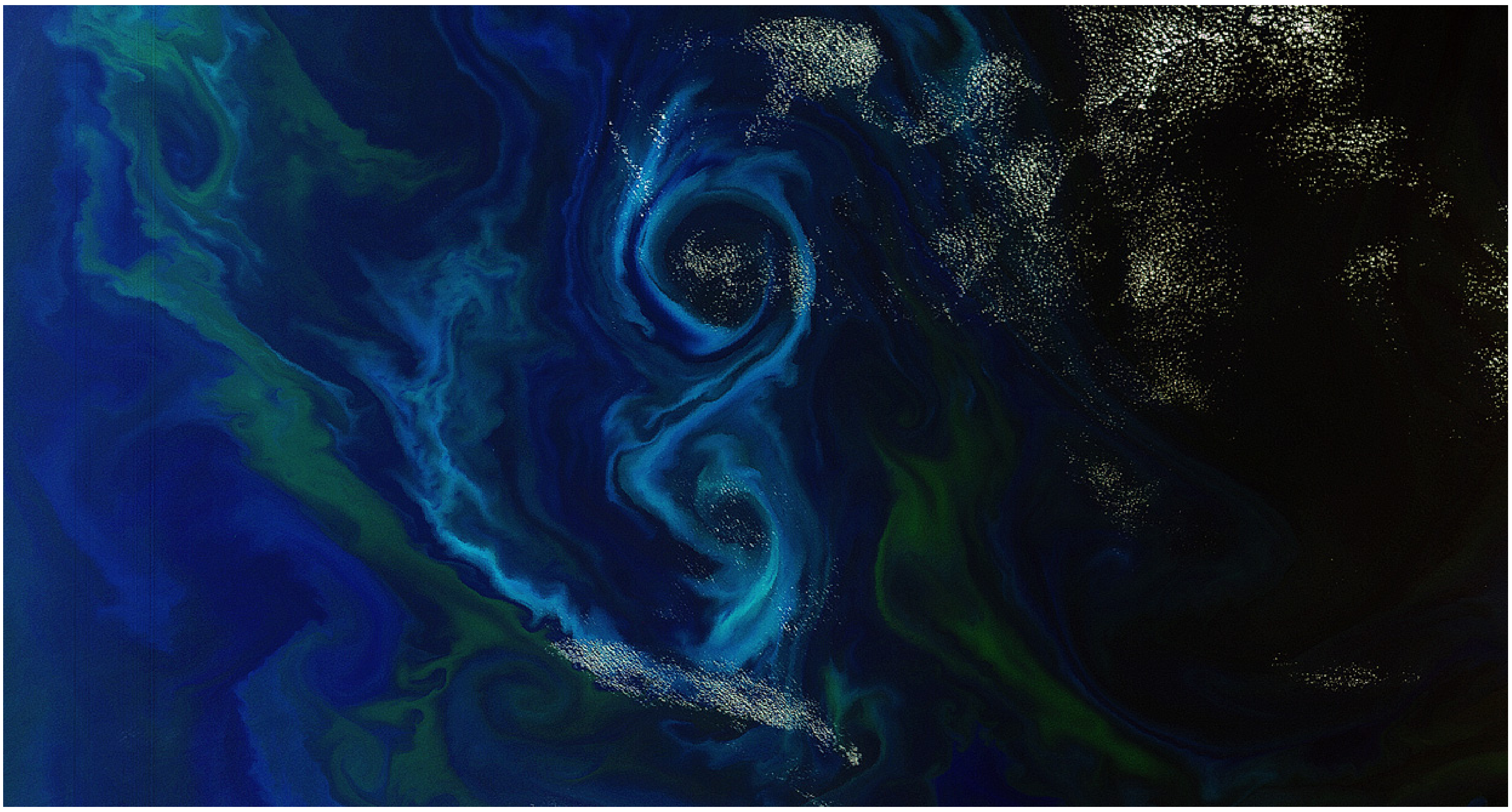
Boston University Physics Colloquium



Uncovering the Hidden Skeleton of Flow Transport

Recent years have seen several major environmental disasters throughout the Earth's oceans, such as the the Deepwater Horizon oil spill and the Tohoku Tsunami that caused the release of substantial amounts of debris and radioactive contamination. In each of these disasters, material was released from what was essentially a point source into the environmental flow, and understanding how this material would be transported was of paramount importance.

In order to predict the outcome of pollution events such as these, the standard approach is to run numerical simulations and use the resulting velocity field data sets to generate predicted trajectories of the pollutant. Whilst certainly a powerful predictive tool, the resulting trajectories can often be convoluted, resulting in "spaghetti plots" that are difficult to interpret. More significantly, the trajectory analysis approach provides little explanation as to 'why' things evolve the way they do.

To improve understanding and forecasting, therefore, there is a pressing need to develop new concepts and methods that provide deeper insight regarding flow transport. We present an overview of novel approaches for uncovering the underlying skeleton of Lagrangian transport. Both idealized and real world examples are used to demonstrate the methods.

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December 10, 2013 (Tuesday) at 3:30pm (Refreshments at 3:00pm)

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