



# Scientific Visualization 210

## ParaView: Flow Visualization

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KAUST Visualization Core Lab

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# Getting Started

- Install ParaView (preferably v6.1.0)
  - Download: <https://www.paraview.org/download>
- Workshop Materials
  - Visualization Lab Wiki: <https://wiki.vis.kaust.edu.sa>
  - Training Page: <https://wiki.vis.kaust.edu.sa/training/overview>
  - Download data sets and slides:  
<https://wiki.vis.kaust.edu.sa/training/scivis/2026/paraviewflowviz>

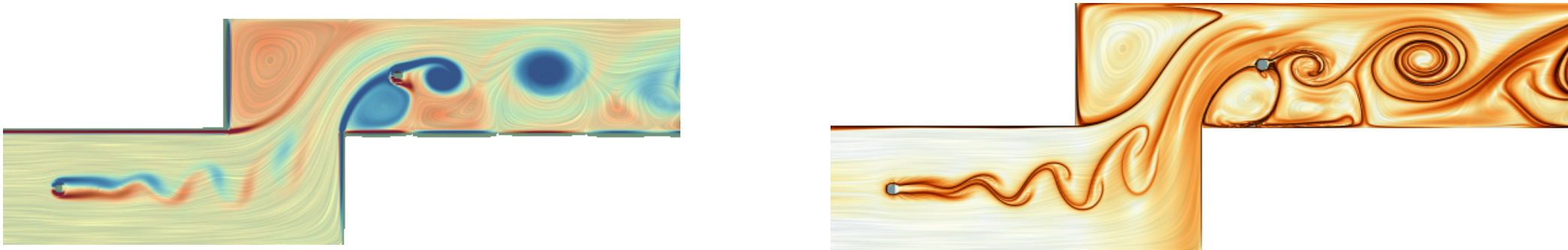
# About the Data



<https://cgl.ethz.ch/research/visualization/data.php>

Simulation of a viscous 2D flow around two cylinders. The fluid was injected to the left of a channel bounded by solid walls with a slip boundary condition. The unstructured grid was adaptively discretized based on the vorticity. Initially, a vortex street forms behind the first obstacle, which then flows around two corners. Behind each corner, a standing vortex forms. The latter one blocks half of the flow to the second obstacle, creating a one-sided vortex street.

We will use a modified version of it in this workshop (download from the workshop web page <https://wiki.vis.kaust.edu.sa/training/scivis/2025/paraviewintro>).





# Workshops Goals and Agenda

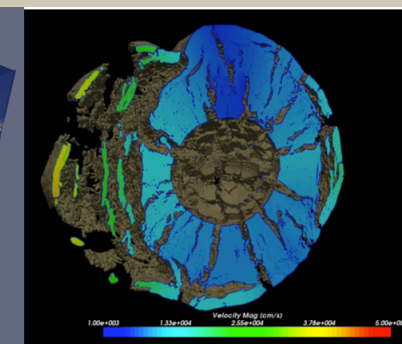
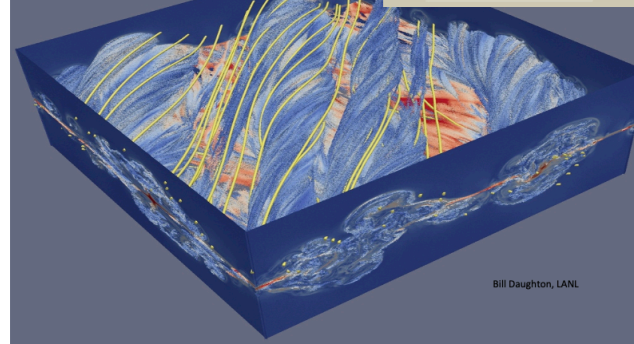
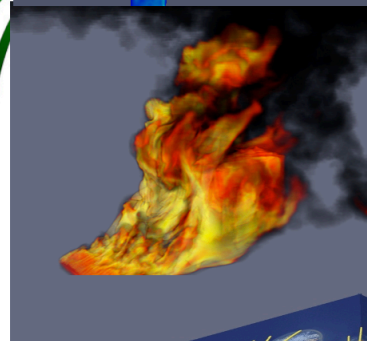
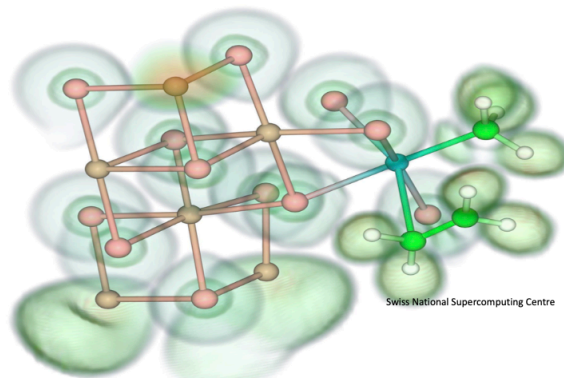
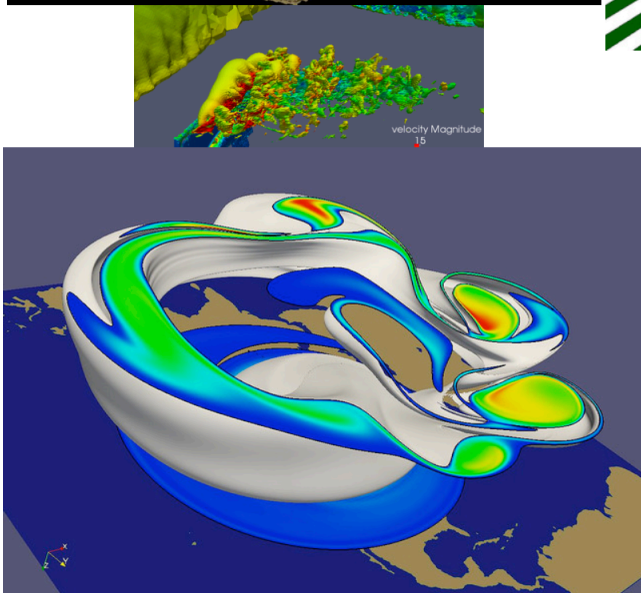
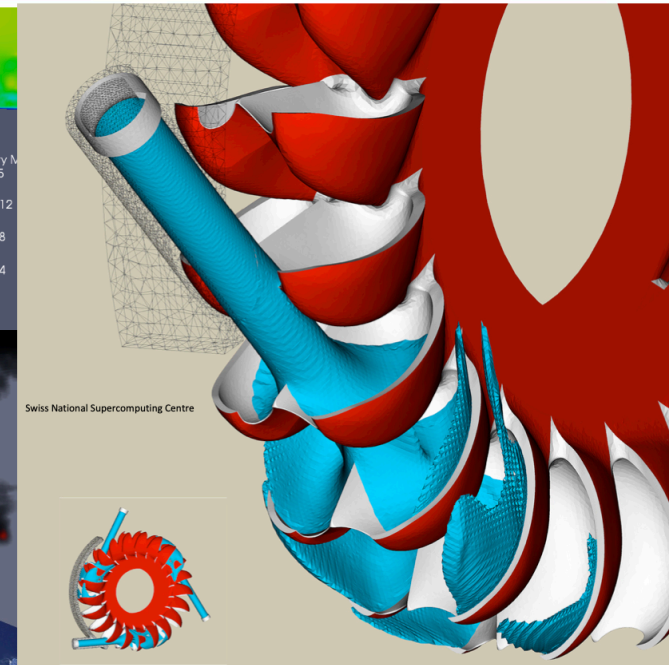
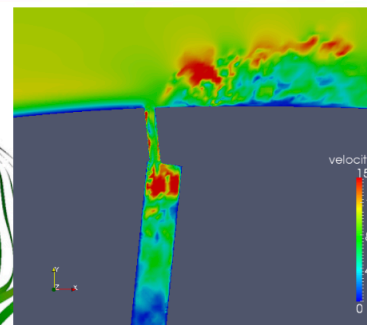
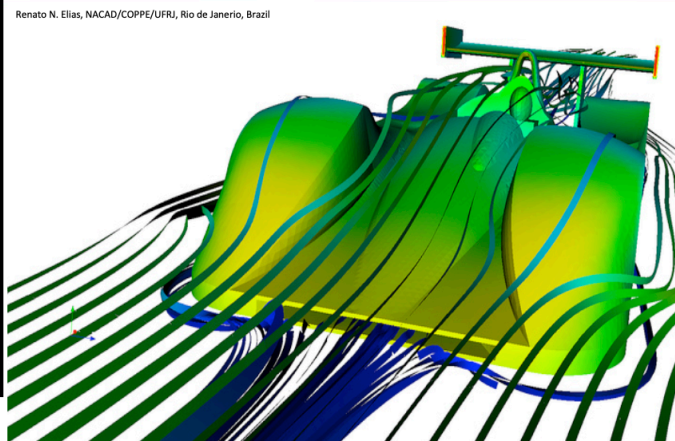
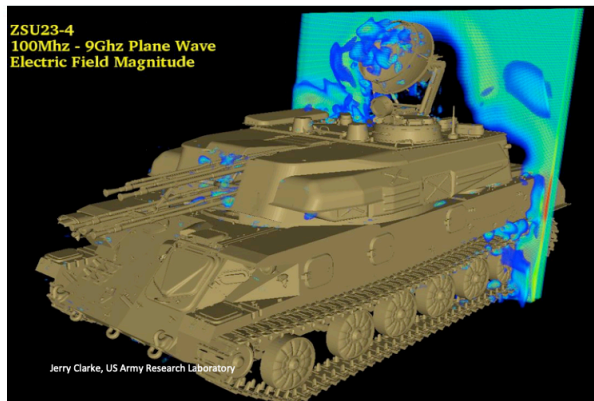


# Workshop Goals

- Hands-on learning with ParaView
  - Introductory course on time-dependent flow visualization
  - Slides / demonstrations
- What is ParaView ?
  - Opensource, scalable, multi-platform visualization application
  - Support for distributed computations to process large datasets
  - Commercial maintenance and support (Kitware Inc.)
- Why Paraview @KAUST
  - Available on all major computational resources at KAUST
  - Paraview on Ibex and Shaheen
  - Paraview @ KAUST Visualization Laboratory



# What is ParaView?

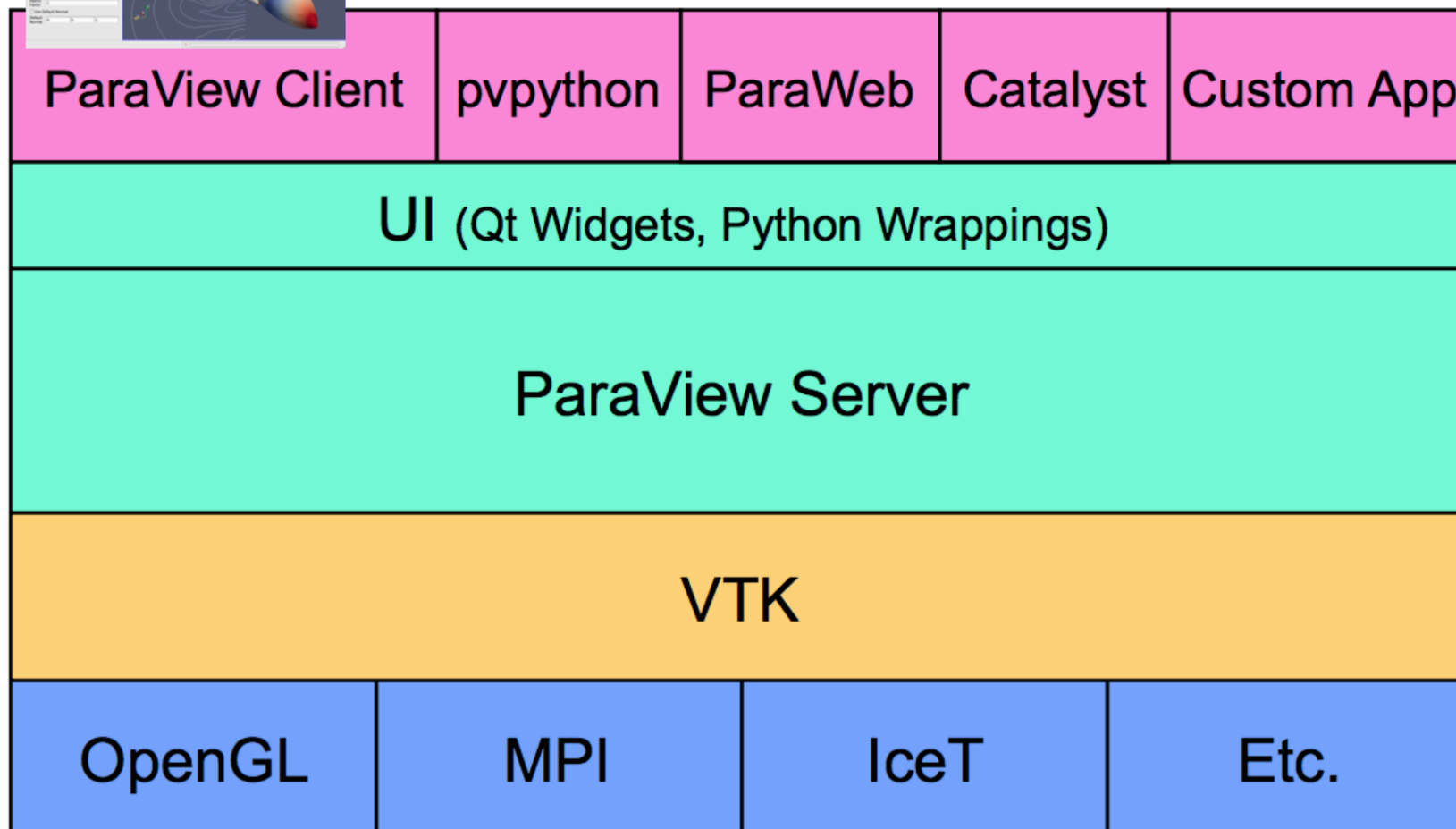
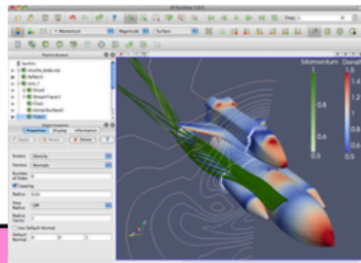


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Source: Paraview Tutorial Slides



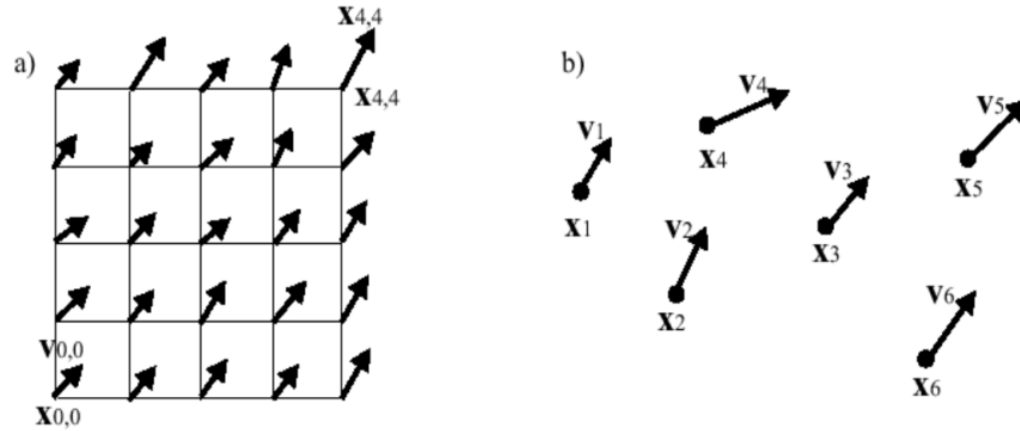
# ParaView Architecture



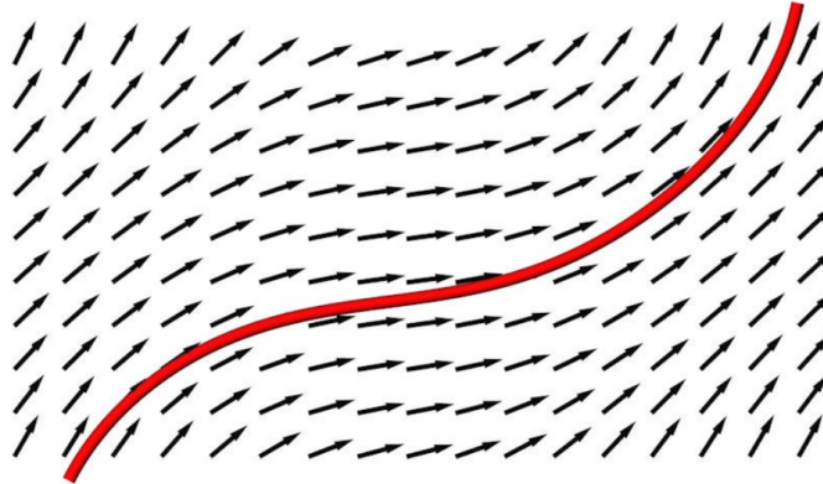
# Vector Field Visualization Techniques



- Arrow plots

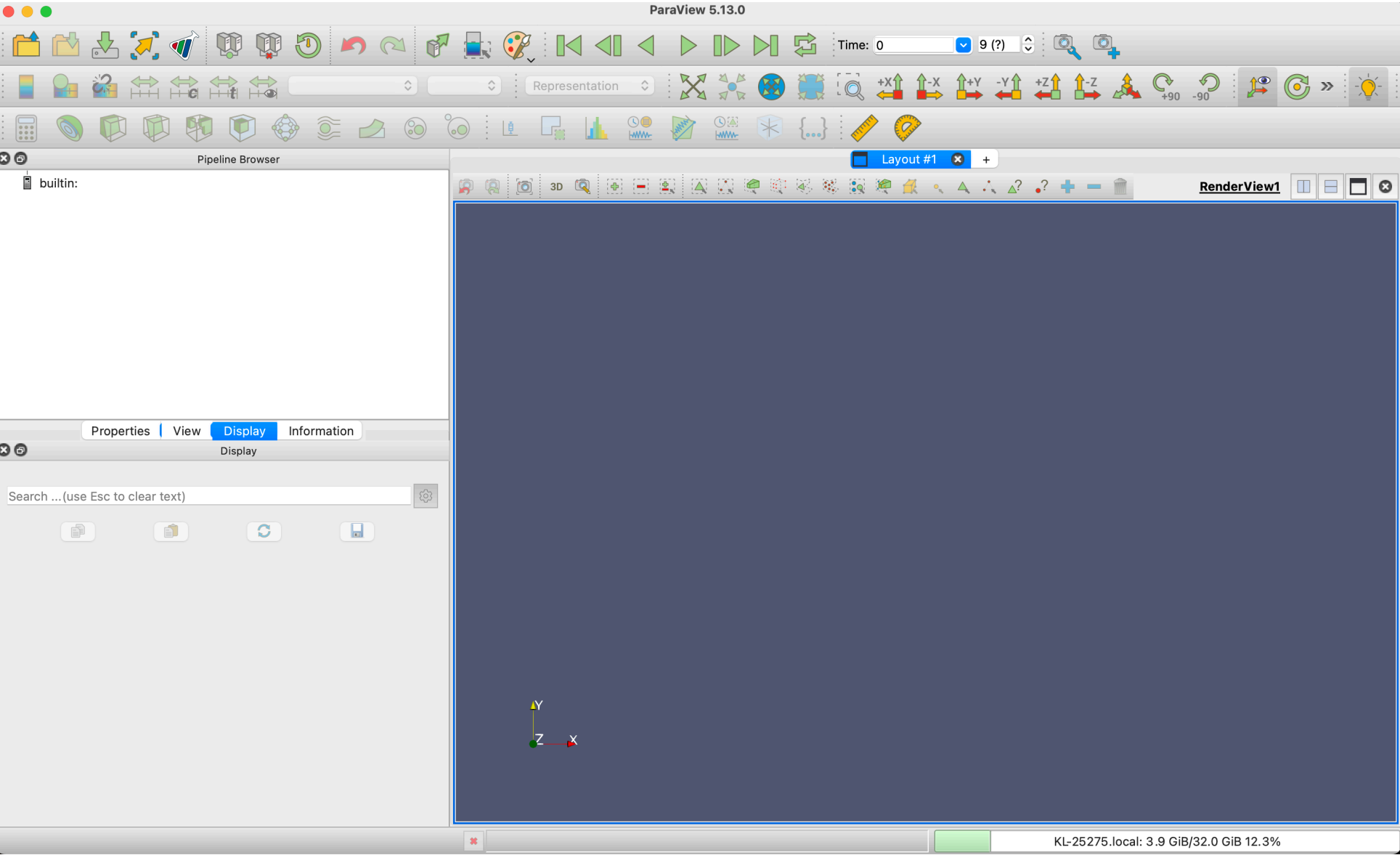


- Streamlines



- Pathlines, particle animations, Line Integral Convolution (LIC)

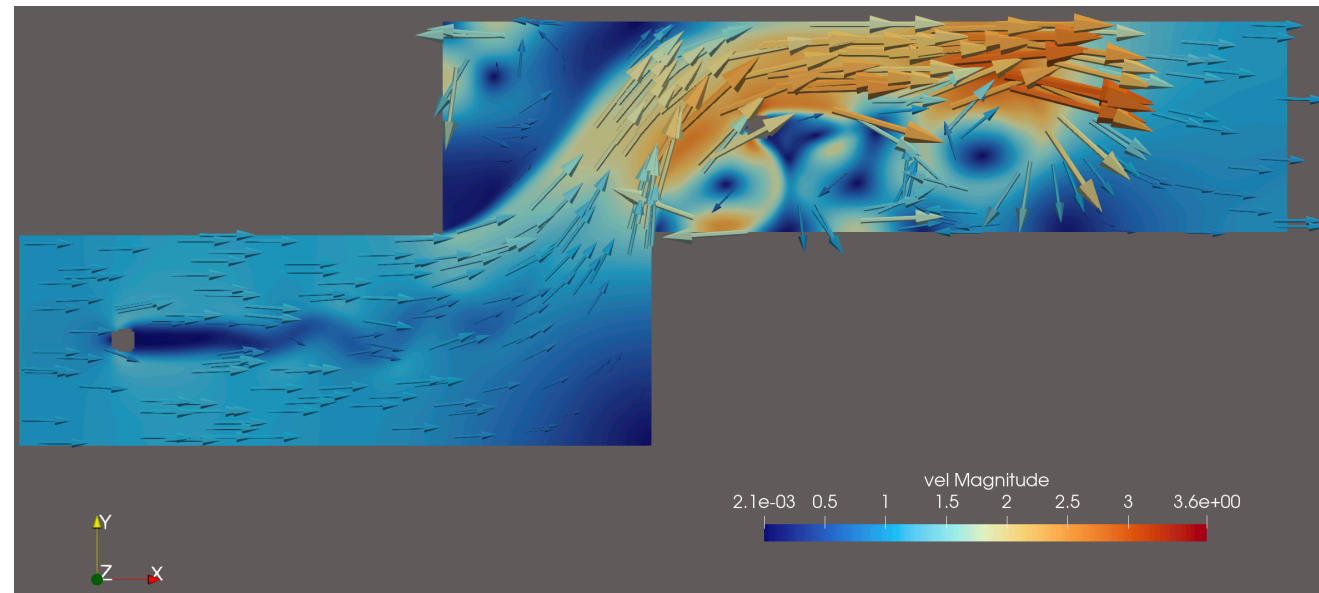
# Basic Interaction





# Vector fundamentals

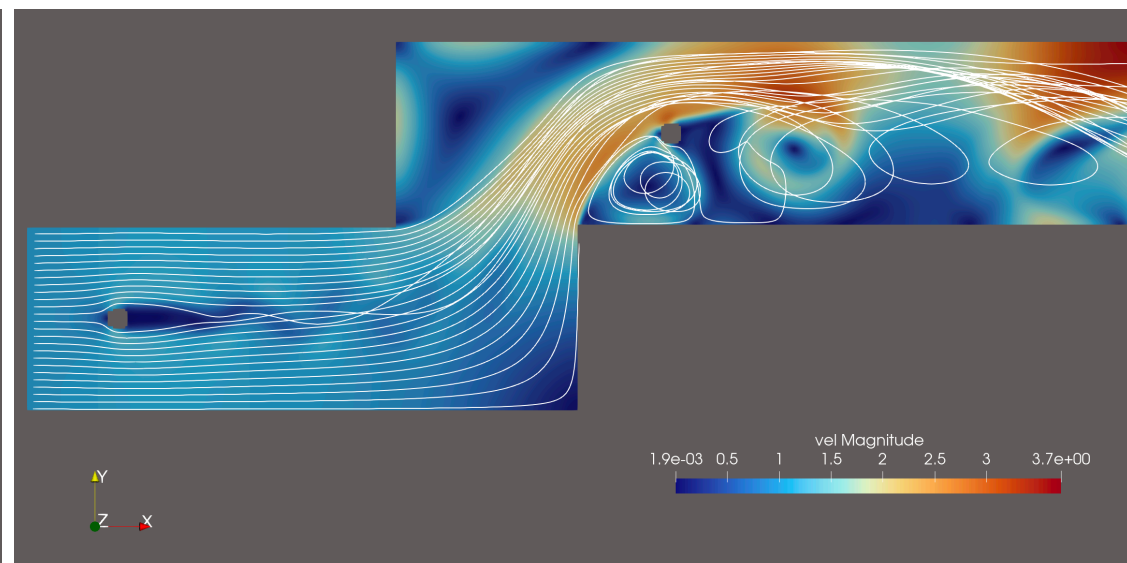
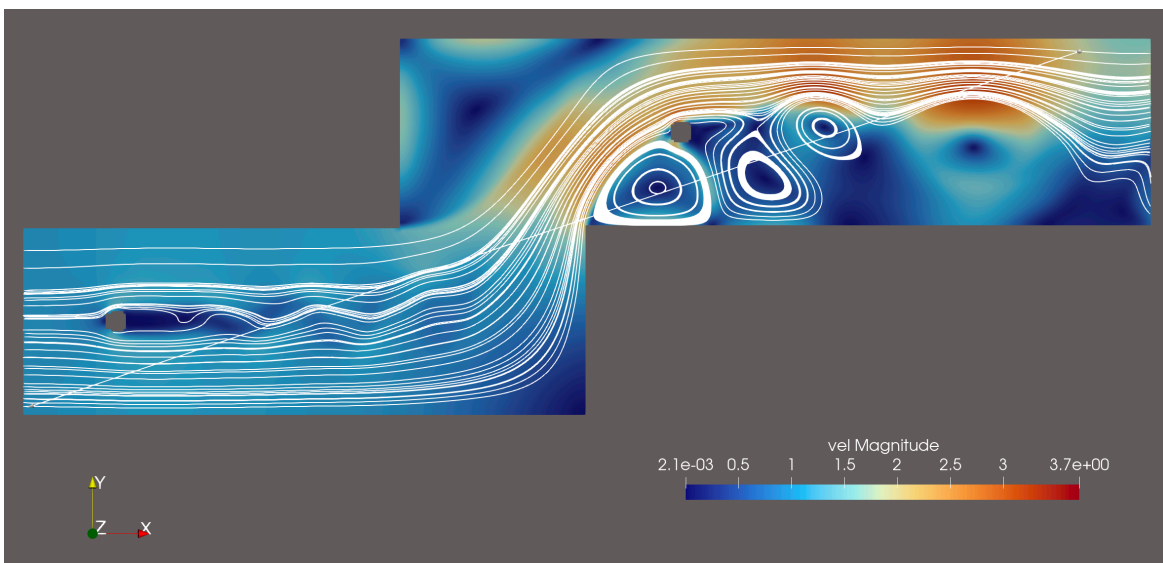
- Data loading
  - useful filters: Temporal Shift Scale, Append Attributes, Calculator
- Arrow plots
  - Useful filters: Glyph, Resample to Image





# Integration techniques (1/2)

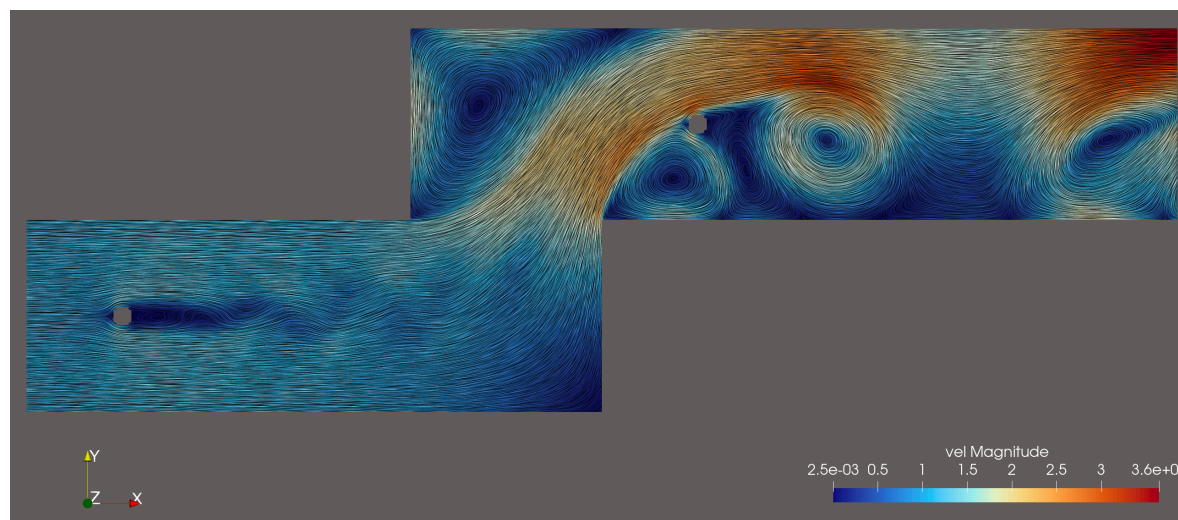
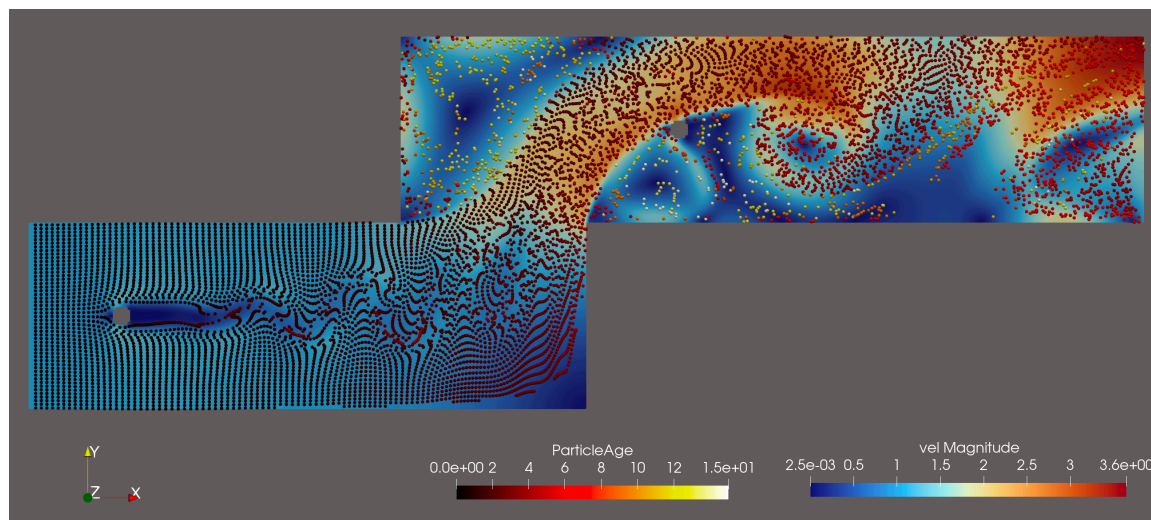
- Streamlines
  - useful filters: Glyph, Resample to Image
- Pathlines
  - useful filters: Sources->Geometrical Shapes->Line, Particle Path



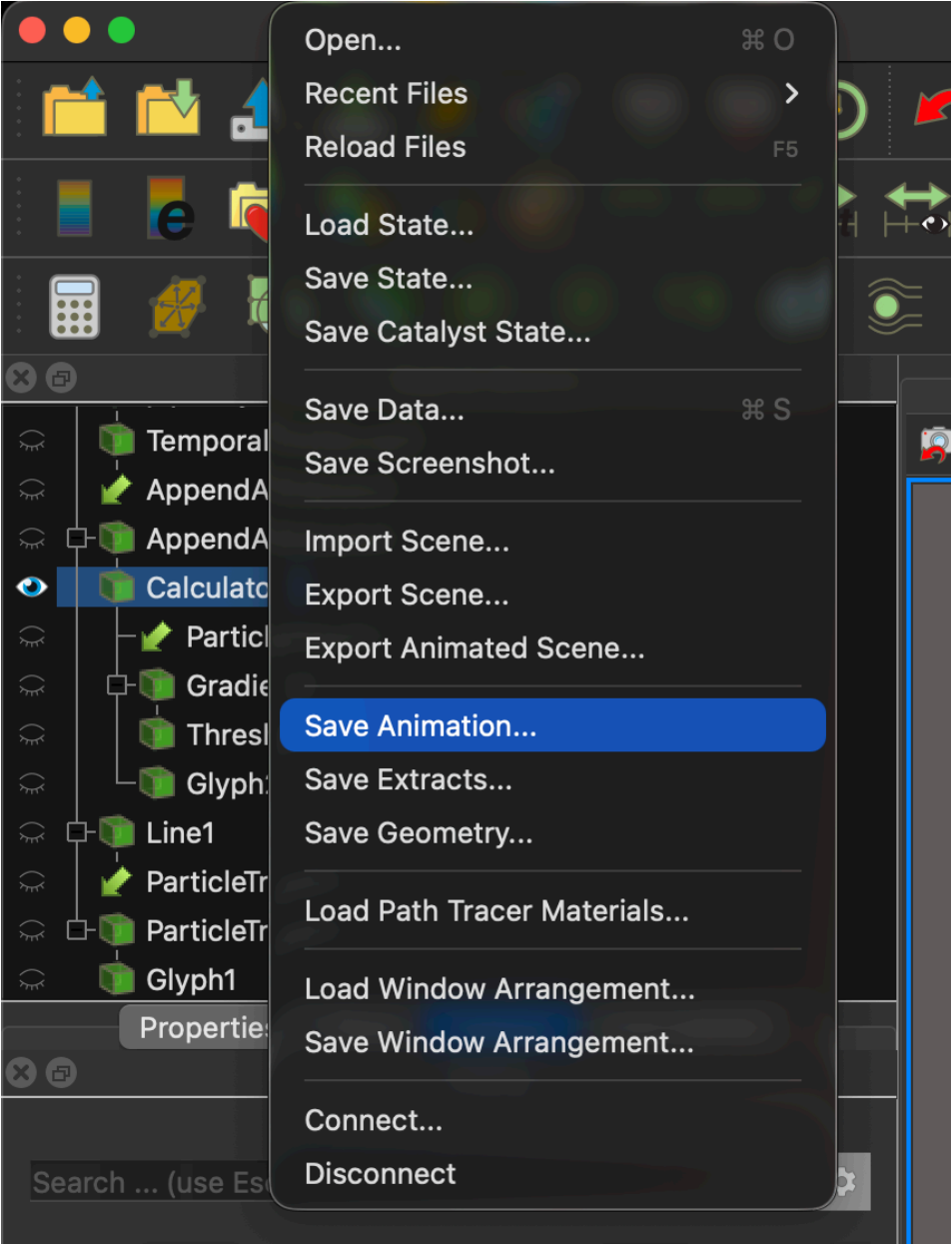


# Integration techniques (2/2)

- Particle animations
  - useful filters: Sources->Geometrical Shapes->Line, Particle Tracer
- Line Integral Convolution (LIC)
  - no filters, just change the representation to „Surface LIC“



# Creating Videos





## Scientific Visualization Workshop Series Spring 2026

Date	Training Event	Speaker	Registration
April 7, 2026	<a href="#">Scientific Visualization 210: Introduction to In Situ Visualization</a>	James Kress	Closed
April 13, 2026	<a href="#">Scientific Visualization 210: Flow Visualization</a>	Thomas Theussl	<a href="#">Register Here</a>
April 15, 2026	<a href="#">Scientific Visualization 101: ParaView for HPC</a>	Thomas Theussl & James Kress	<a href="#">Register Here</a>
April 12 & 14, 2026 :: 1pm - 3pm	<a href="#">KVL Drop in Times for Visualization, AR/VR. and Avizo Questions</a>	KVL Showcase, Building 1, 2303	No registration necessary, just drop in
April 28, 2026	<a href="#">Scientific Visualization 101: Augmented and Virtual Reality for Data Visualization</a>	Ronell Sicat	<a href="#">Register Here</a>