

Breakout_C-5 (Scientific visualization of large fluid dynamics dataset should play a key role (“seeing is believing”) not only as a research tool but also as educational and outreach components.)

Issue: https://github.com/CFDSI/Kickoff_Workshop/issues/#

Related Issues:

Issue Statement: [Scientific visualization of large fluid dynamics dataset should play a key role \(“seeing is believing”\) not only as a research tool but also as educational and outreach components.](#)

Discussion topic:

Moderator: Mike Kirby

Note taker: Patrick O’Leary

Reporter: Charles Meneveau

Group Members:

- Patrick O’Leary
- Jean Hertzberg
- Mike Kirby
- Charles Meneveau
- *Scott Dawson*
- *Cal,*
- *Jurgen Seidel,*
- *Javier Jimenez,*
- MP Martin
- Corey Wetterer-Nelson
- Eric Peters
- *Hassan Nagib*

Please address these topics in your discussion (moderators please make sure that there is enough time to cover all three before the session ends).

1. Describe the problem:

- Visualization for both processing and analysis - Is there a gap between

- simulations and visualization tools - (Higher-Order Elements, Face Nodes, ...)
- Standardization of outputs (Metadata) that promote visualization and analysis
 - Local or Remote visualization - wait for download or latency in interaction (Security)
 - DOD or Centers are Compute focused not Post-processing focused
 - Technology Gap and Education Gap
 - Software training - from connection to pipelines
 - Where visualization takes place is changing, moving from the desktop application (TecPlot, ...) to inside Python, R, MatLab, ...
 - Limited use of complex visualization techniques, mainly slices of 3D data
 - Need for specialists - HPC responsibility or CFDSI responsibility?
 - Financial model? How would such a group within FDSI support itself in the future?
 - Importance of visualization for outreach

2. What are potential solutions?

- Bring together simulation scientists with data scientists (visualization experts) to ask the right questions for standardization

3. What can XFDSI do to help?

- Build a community - education (internally and externally), sharing techniques and software, catalogue
- XFDSI will interface with visualization tools providers of CFD code needs/requirements for post-processing
- XFDSI serve as community interface with solver community on visualization needs
- Use visualization success stories to help with outreach to highlight fluid mechanics
- Help individual researchers who have developed ad-hoc in-house viz tools to go extra mile to open-source their tool (e.g. via expert “fellows”..).

4. Misc ideas so they don't get lost (e.g., Did you find new issues? If yes, create the issues on GitHub!):

- We want velocity vectors that are fuzzy looking or jittery depending on uncertainty at that location

5. Summary for report-back (Alternatively, just bold the key points above):

- **Need to build a community - education (internally and externally), sharing viz-techniques and software, catalogue software**
- **XFDSI will interface with visualization tool providers to better inform them of community needs/requirements for post-processing**
- **XFDSI serve as community interface with CFD solver community on visualization needs**
- **Use visualization success stories to help with outreach to highlight fluid mechanics**
- **Help individual researchers who have developed ad-hoc in-house viz tools to go extra mile to open-source their software (e.g. via expert “fellows” ..).**