

## Breakout\_C-1 (can map to issue name later)

Issue: [https://github.com/CFDSI/Kickoff\\_Workshop/issues/#](https://github.com/CFDSI/Kickoff_Workshop/issues/#)

Related Issues:

Issue Statement: How do we help the community recognize that CFDSI is about software infrastructure associated with all fluid dynamics data, not just CFD?

Discussion topic:

Moderator: Doug Smith (AFOSR)

Note taker: Ramesh Balakrishnan (Argonne/DoE)

Reporter: Ellen Longmire (U. Minnesota)

Group Members:

- Beverley McKeon (Caltech)
- Ellen Longmire (U. Minnesota)
- Matt Churchfield (NREL)
- John Farnsworth (CU Boulder)
- Doug Smith (AFOSR)
- Anya Jones (U. Maryland)
- Ramesh Balakrishnan (Argonne/DoE)
- Luciano Castillo (Purdue U.)
- Federico Toschi (Eindhoven U. Tech.)
- Scot Breitenfeld (HDF Group)
- Dan Katz (U. Illinois Urbana-Champaign)

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:

- This question is really important!!
- Central to the issue is what do we mean by “software”? What kind of software infrastructure, in CFDSI, are we talking about? So, CFD solvers can be considered part of the software infrastructure although not the only aspect of the software infrastructure. The “data” we are talking can come from experiments, observations, and computations. There is, for example, software development that is necessary for analyzing PIV data.
- There are a lot of CFD codes that are gateways used by students - how should they be incorporated by the institute? nanoHUB is an example of how another community has addressed a similar issue.) When provided with the CFD simulation software, the CFDSI could encourage students to simulate the flow

and also assess, first hand, how good their simulation are by comparing with experimental/observational data.

- Gateways could potentially help democratize/diversify access to CFD resources and knowledge.

## 2. What are potential solutions?

- Surveys should be done broadly across the community to poll the directions.
- Consider dropping the “C” from CFDSI to be more encompassing and not immediately alienate experimentalists
- Pretty unanimous about keeping it defined as “Fluid Dynamics”, that encompasses convection, and motion.
- We need to track the history of how the data was collected, details of the experiments, and also updates to the data as newer experimental methods become available.
  - We cannot continue to accept “old” experimental results as gold standards; especially when computations can be performed at a considerably finer resolution.
- Slogan: “Software infrastructure for the acceleration of analysis and prediction of fluid dynamics.” (Abbreviation: xFDSI)
- Focused outreach or sub-community workshop towards “Experimental Fluid Dynamics Software.”

## 3. What can CFDSI do to help?

- Build up collective knowledge about experiments, data sets, software, etc. so that the community knows what has been done that they can use
- An example: EUHIT, a formally finished (under review now) project where people apply to get a grant to do experiments at experimental facilities.
- In an effort to bring experimental and CFD researchers together, the CFDSI can promote/announce some challenge problems where CFD simulations can be done to see how well the simulations do. This would help assess the drawbacks of both the simulations (codes, subgrid models, etc.) as well as how good the experimental data (that is provided) is, and what additional experimental data would be helpful. As an example, something like the Ductile Failure X-Prize (SAND2011-6801)
- This potentially broadens access for underrepresented groups to the participate at a high level in the fluid dynamics research/education community. This is a key interest of NSF and the AFOSR (consider connections to EPSCoR).

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

- 

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

-