02b.Overview 1

Friday, January 19, 2018

Today:

Admin

Finish First Assignments

Start Overview: Choices in imaging

Name Table Tents

Put signed Use Agreement, Syllabus Agreement, on piles up front.

Logins: Wordpress/Flowvis.org? Slack? CATME?

Don't forget to use your name table tents please.

OFFICE HRS

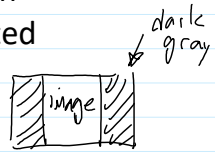
ITLL orientations: For after-hours access and computer login, attend a 1/2 hr tour. Find out what resources are here, agree to not spill drinks on the keyboards:
https://itll.colorado.edu/information/access-and-tour-information/
You may take an orientation tour Monday-Friday at 5:15pm, or 1:15pm on Sundays. The tour starts in front of the ITLL LaunchPoint on the top floor. Don't forget to bring your BuffCard.

Lecture notes will be posted on the Flow Vis site. Feel free to nag me.

First Assignments
http://flowvis.org/media/course/initialassignments.pdf
Have you read this? Questions?
Clouds: There will be two Cloud assignments, with the first due Friday October 11, and the second image due Nov 13. This is to give plenty of opportunity to observe a variety of atmospheric conditions. Images made before Aug 26 2019 will not be acceptable for the Cloud First assignment, and images made before Oct 11 will not be acceptable for the Cloud Second assignment.
Keep notes on time, date, your location and orientation (facing north etc).

Get Wet and other assignments: Please, no food coloring dropped in water unless it says something new; shows different phenomenon from all the other images posted in the past, or shows it better; slow motion, very close up, etc.

All assignments: Make your image uploaded to flowvis.org no larger than 1300px wide, no more than 900 tall. Best to pad width of portrait oriented images.



Overview 1: Topics will be presented iteratively.

Previsualization: Have a goal, think about what you want it to look like.
Make CHOICES:

1. Flow phenomenon: Water boiling? Faucet dripping?
2. Visualization technique: Add dye? See light distorted by air/water surface?
3. Lighting (source of worst image problems)
4. Image acquisition: Still? Video? Stereo? Time lapse? High speed?

5. Post processing, final output. Edit, at least crop the image and set contrast.

1. Flow phenomenon: ***Why does it look like that***?

What are the forces? = a framework for interpretation of the image

Minute paper. In groups (3 or so) list all the forces that can act on a fluid. Write on a scrap of paper to hand in.

Magnetic
Gravity
Buoyancy
Air resistance
Molecular adhesion
Surface tension/VanDerWaals
Pressure
Shear forces/friction
Centripetal
Work,i.e turbomachinery
Capillary
Hydrophilic/phobic
Temperature gradients
Phase change
Molecular cohesion
Viscosity/shear
Chemical: Explosions
Fluorophilic/phobic
Wind
Convection

Minute paper results:

Viscous
Shear
Gravitational
Buoyancy
Electromagnetic
Electrostatic
Inertial
Centripedal/centrifugal
Pressure
Body forces: gravity, buoyancy, EM
Viscosity, shear, friction
Thermal diffusivity

Air resistance (drag)
Cohesion
Adhesion (capillary action)
Normal force
Stress
Strain
Thermodynamic
Heat
Convection
Osmosis
Solar radiation

Composition of fluids
Densities of fluids
Chemical reactions
Impact
Wind
Mass
Acceleration
Temperature
Phase change
Strong, weak nuclear forces
Cavitation
Vortex structures

Viscosity, shear, friction
Thermal diffusivity
Interaction with other fluids
Surface tension
Intermolecular

Osmosis
Solar radiation

Strong, weak nuclear forces
Cavitation
Vortex structures
vortex stretching
concentration gradient

Good, inclusive list. Not all are forces, but all can 'drive' a flow via a set of physics or mechanism. Heat, for example.

Force - Any action applied to an object which would cause the object to move, change the way it is currently moving, or change its shape. A **force** can also be thought of as a push (compressive **force**) or pull (tensile **force**) acting on an object.

Engineering Terms
www.pre-engineering.com › resources › engineeringterms

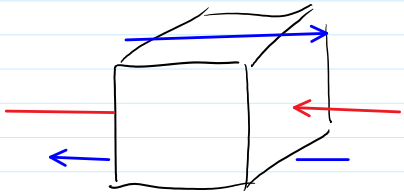
All *forces* can be categorized like this: 2 types of forces

Body

Acts directly on every molecule equally
a) Gravity
b) Electromagnetics

Surface

Acts on the surface of a volume of fluid



Pressure: always perpendicular to surface
Shear: always parallel to surface

Any surface force can be decomposed into a shear plus pressure
Note: these are actually STRESSES = Force acting on an area.