

# ESS 524 Class #18

Highlights from last Wednesday –Shashank

Today's highlights report on Wednesday – Erich

Today

- Project updates
- Homework questions?
- Welcome Daniel Shapero
- FireDrake FEM software
- symPy (Python symbolic math)

<https://mybinder.org/v2/gh/danshapero/fire Drake-binder/master>

# Coming up

- Today – Daniel, Class #2

Reading for discussion next Wednesday (See READING tab)

- Oreskes (1994) *Science*, and comments
- Roache (1997)
- Versteeg and Malalasekara – Chapter 10, Section 10.5, *Verification and Validation*

Project oral reports (AGU style, ~10 minutes)

- Thursday June 11, 2:30

Project written reports (*GRL* or *Geology* style & length)

- Friday June 12.

## Preparing for Wednesday

I would like each of you to prepare to lead discussion at our next class, on one of the topics below, broken out roughly following the developments in the two papers.

1. What is “verification” and what is “validation”?
2. Can modeling teach us (or policymakers) anything useful, and is Oreskes guilty of Roache’s charge of “worthless semantics and effete philosophizing”?
3. What are some practical approaches to model testing?

I suggest that you come up with at least 3 questions that you will pose to your classmates, and be prepared to discuss.

For everyone:

What uncertainties are there with your project model, and what will you do to assess them?

## Higher-order schemes, colocated grids

Many general codes now use quadratic interpolation in order to evaluate velocities and pressures at the same nodes in unstructured grids, while avoiding the checkerboard patterns that arise with linear schemes.

See these papers under READING tab

- Peric et al. (1988)
- Tinnaluri and Devanuri (2015)

The paper on a structured curvilinear boundary-fitted scheme by

- Price et al. (2007)

is also posted there.

Also see Versteeg & Malalasekera, Chapter 5.9, QUICK scheme