

Session 4: Future Directions for SEAS

- Bruce Shaw on “Earthquake complexity, Simulators, and SEAS”
- Group Discussion
- Planning for 2021 and Beyond

Participant Survey

- YOUR HAVE LIST (to help advance the SEAS efforts): What information and/or products could your research group provide to advance the SEAS efforts?
- YOUR WISH LIST (in the context of SEAS activities): What types of SEAS activities/benchmark exercises would help advance your group's research?
- Have you participated in past SCEC SEAS benchmark exercises?
 - If you answered YES above, what were the most valuable takeaways from participating? How did the benchmark exercises help advance your science?
 - If you answered NO above, please describe (a) any circumstances that made it difficult to participate and/or (b) what could be done to better support your participation in future SEAS exercises?
- What types of benchmark exercises can your group participate in?
- PIE IN THE SKY (aspirations for SEAS): What future avenues of research and development should the SCEC SEAS group pursue?
- CRITERIA FOR SUCCESS: What constitutes success of the SEAS code verification efforts?

CRITERIA FOR SUCCESS (from survey)

What constitutes success of the SEAS code verification efforts?

- Demonstrate progress in achieving (pre-identified) research targets for coordinated group efforts.
- Show robust features that are consistent among various codes and methods and their limitations (establish best practices and highlighting limitations openly).
- Open community that continues to recruit new modelers.
- Benchmarks that critical mass of groups can participate in.
- Confidence in simulations and identification of robust features consistent among different codes.
- Establish modeling standards for after the end of SEAS activity period (e.g. provide guidance on essential data/figures to report).

DISCUSSION TOPICS (from survey)

- What observations are available to constrain our models?
- How do we test and validate our models?
- How do we recruit additional effort and support new modelers?
- What resources or tools would facilitate better coordination?
- How do we establish best practices and highlight limitations openly?
- What should our research targets be for the next 1-2 yrs?

CURRENT BENCHMARKS (from survey)

What benchmarks can groups participate in?

- **Stanford:** 2D only but with full dynamics (currently antiplane shear with planar faults but soon will be able to do plane strain in complex geometries), viscoelasticity, and fault-zone fluid flow
- **UMich:** antiplane plasticity and in-plane elastic earthquake cycle models
- **Victoria:** viscoelastoplastic, quasi-dynamic
- **Oregon/NPS:** BP1/2-QD, BP3-QD
- **Team GARNET:** currently working on BP1; more or less any (but our method has limited geometric flexibility)
- **TAMU:** 3D; fully dynamic earthquake cycles; simple or complex fault geometry
- **Tokyo:** everything except off-fault inelastic deformation is included

NEXT BENCHMARKS (from survey)

- fluids
- viscoelasticity
- complex geometries
- variable/bimaterial properties
- finite computational domain size problems?
- ...

Miscellaneous Topics

- Slack channel? (suggested by multiple groups)
- Making model results public on the platform?