Welcome to the (online) SCEC SEAS Workshop!

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Session 1: Workshop Goals and Science Targets
Goals of this workshop:

- Welcome new participants and provide a history of SEAS activities.
- Review and discuss recent SEAS efforts and benchmark problems and how they related to scientific targets.
- Discuss upcoming benchmark problems.
History of SEAS:

- Held 1st workshop with dynamic rupture group in April, 2018 (thanks Ruth Harris)
- 1st SEAS-specific meeting (November) and acquired SCEC funding in 2018.
- This is our 5th workshop to date.
History of SEAS:

● Launched SEAS platform in 2018 (Michael Barall)
  ○ https://strike.scec.org/cvws/seas/index.html

● Have completed 6 benchmark problems, one paper published (24 co-authors) and one submitted (19 co-authors).
History of SEAS:

- First two benchmarks, BP1-QD and BP2-QD involving 11 modeling groups...

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Erickson, Jiang et al. SRL (2020)
History of SEAS:

- … and focused on a fundamental problem in crustal faulting based on Rice (1993), done in 2D with quasi-dynamic rupture.

Erickson, Jiang et al. SRL (2020)
History of SEAS:

- Our follow up benchmarks have focused on 3D problems, full dynamics and dipping fault geometries.

Erickson, Jiang et al. SRL (2020)
Overarching Science Targets:

- Advancing robust predictive models of earthquake source processes.
- Determining what physical processes explain observables.
- Complimenting and informing dynamic rupture simulations and earthquake simulators.
Persistent Numerical Challenges in SEAS modeling

- Variable time-stepping
- Choices in computational domain size and boundary conditions
- Problem nonlinearity and round-off errors
- How to determine legitimate solution differences?
- Numerical efficiency and computational performance
- Resolution of important spatial/temporal scales
Current Science Targets:

- Verifying SEAS models with increased complexity (e.g., full dynamics, dipping geometries, free surface).
- New benchmarks focused on fluid effects and additional problems in 3D.