Developing Productive SCEC Research Computing Collaborations

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A large consortium of institutions that coordinates earthquake research in Southern California

Core institutions 19

Participating institutions 59

Domestic institutions 44
International institutions 15
Response to RFPs

- Goulet + Maechling collect needs from community
- Goulet develops strategic science plan for the year; partitions among programs
- Goulet assembles team and drafts proposal with input from all

Partnership development

- Longer-term planning with funding entities
- Supports continuity of programs
- Can involve partners in-house scientists time
- Utilities and eng. Centers targeted first
- Other corporations targeted when time permits

Funding

- SCEC ExCom flag RFPs
- Group decides on go/no go
- Group identifies PI/Leads
- PI/Leads form team and develop proposal with support from Research Computing, Operations, etc.

Allocations

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Frameworks: Cyberinfrastructure for Simulation-Based Domains Applied to Seismic Hazard Research

Goal 1: Produce verified and validated realistic ground motion simulations at high frequencies (>10 HZ).
Goal 2: Deliver cyberinfrastructure and data products to the broader community.
HPC allocations - 2019

**INCITE (Summit, Theta)**: Kyle Withers (USGS), Luis Dalguer (3Q Lab), Yifeng Cui (SDSC), Kim Olsen (SDSU), Daniel Roten (SDSU), Phil Maechling (SCEC), Scott Callaghan (SCEC), Yehuda Ben-Zion (SCEC), Yongfei Wang (UCSD), Ossian O’Reily (SCEC), Christine Goulet (SCEC)

**XSEDE (Stampede-2, Comet, Bridges, ECSS)**: Yifeng Cui (SDSC), Dmitry Pekurovsky (SDSC), Phil Maechling (SCEC), Bruce Shaw (Columbia), Zhigang Peng (Georgia Tech), Kevin Milner (SCEC), Doriam Restrepo (EAFIT), Yehuda Ben-Zion (SCEC), Ossian O’Reily (SCEC), Christine Goulet (SCEC)
Natural Hazards Engineering Research Infrastructure (NHERI)
Searchable Broadband Platform ground motions

- UI to search and retrieve SCEC BBP seismograms
- Allow search on basic parameters:
  - Magnitude, Distance, $V_{S30}$, IM, IM value range
- Open-source code (Python, Pandas, JavaScript and html as a Jupyter Notebook) running within the NEHRI CI system
Participating Universities And Leadership

Currently the following research universities are members of the NHR3, as listed (alphabetically):

- California Institute of Technology
- Southern California Earthquake Center
- University of California, Irvine
- University of California, Los Angeles
- University of California, San Diego
- University of Southern California
Quantifying near-fault displacements using simulations
(NHR3 partnership, CEC, PG&E)

• Scientific Goal:

  • Supplement available observed data on near fault displacements to be included in probabilistic fault displacement hazard analysis (PFDHA) codes

  • Constrain
    • Main trace displacements
    • Secondary displacements
    • Strains at intermediate distance
    • After-slip
    • Uncertainty

• Approach:
  • Use dynamic and kinematic rupture modeling
  • Participate actively with PFDHA groups
PG&E Applied Science Collaboration

- Annual research support
- Overall plan spans 5 years
- Supports coordinated research on hazard and applied science
- PG&E sees value in coordinated efforts and community buy-in
- Topics include
  - ground motion simulations method development
  - simulations validation for seismological and engineering applications
  - tomography and velocity model development
  - site effects modeling
  - geology and fault studies
  - quantification of uncertainties in hazard
  - site-specific ground motion and hazard modeling
  - permanent fault displacements and strains
  - ...

Hazard assessment will improve by
July 2019 Ridgecrest Earthquake Sequence

Post-Earthquake Science Response

response.scce.org

Inter-Agency Coordination and Information Sharing

Managing Partners

Science Group Coordination and Products

NSF RAPID Proposal
Discussions
Future collaborations in Research Computing

Several models possible, formal and informal
- Collaborative response to RFPs
- Shared resources collaborations
- Aggregated capabilities
- Serendipity
- Workshops