Monthly Webconferences

Objectives/Purpose:

- Provide a place where researchers can share the OpenSees-related work they are doing with the QuakeCoRE research community

- Provide a medium through which to hold presentations about OpenSees topics of interest, and to

- Generally facilitate collaboration and sharing between students and faculty working with OpenSees

Typical Agenda (will vary a bit week-to-week)**:**

- Updates on ongoing QuakeCoRE OpenSees development

- Student presentations on past/current/future OpenSees research (shorter)

- Seminars on OpenSees topics of general interest (longer)

- Community questions/discussion sessions

QuakeCoRE and OpenSees

QuakeCoRE is a national network of leading New Zealand earthquake resilience researchers intended to:

- Leverage strengths across the country and internationally

- Facilitate collaborative integrated multidisciplinary research that will support the development of an earthquake-resilient NZ

Flagship Programs:

- FP1: Ground Motion Simulation & Validation

- FP2: Liquefaction Impacts on Infrastructure

- FP3: Heritage, Safety & Economics: Addressing Earthquake-Prone Buildings

- FP4: Next-Generation Infrastructure

- FP5: Pathways To Resilience

- FP6: Spatially Distributed Infrastructure

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Technology Platforms:

- TP1: Experimental Laboratory Facilities

- TP2: Field Testing & Monitoring

- TP3: Open-source Community Datasets

- TP4: Computational Simulation and Data Visualization

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Technology Platform 4:

- Ground motion simulation

- Seismic response modelling of infrastructure

- Seismic performance and loss assessment

QuakeCoRE and OpenSees

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Role of QuakeCoRE with OpenSees:

- Optimize implementation of OpenSees on NeSI HPC resources

- Development of pre/post-processing tools to streamline utilization of OpenSees by QuakeCoRE researchers
    - Mesh generation tools
    - 'Code blocks' for common or typical simulation types
    - Post-processing tools
    - Results visualization

Workshop Survey Results

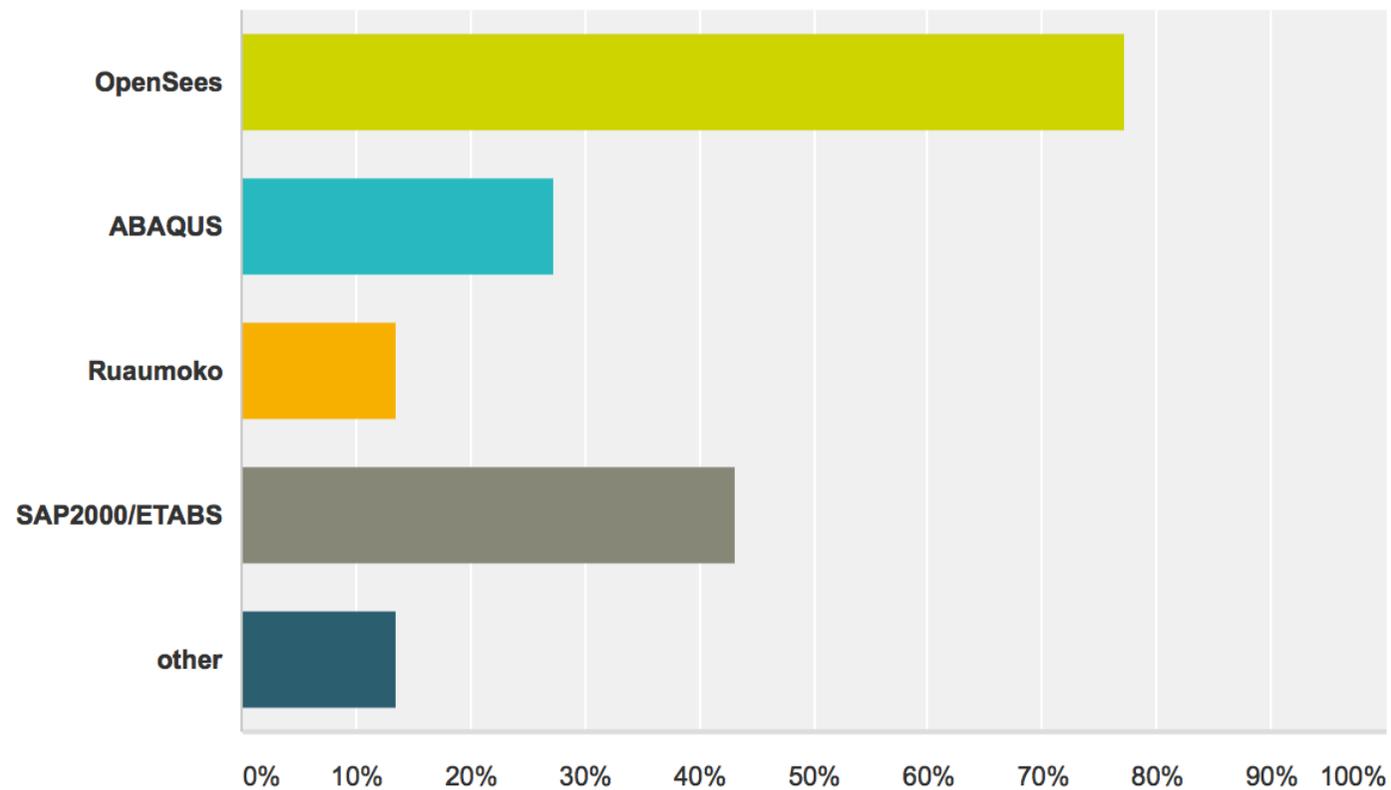**What is your level of experience working with OpenSees?**

Answered: 47   Skipped: 0
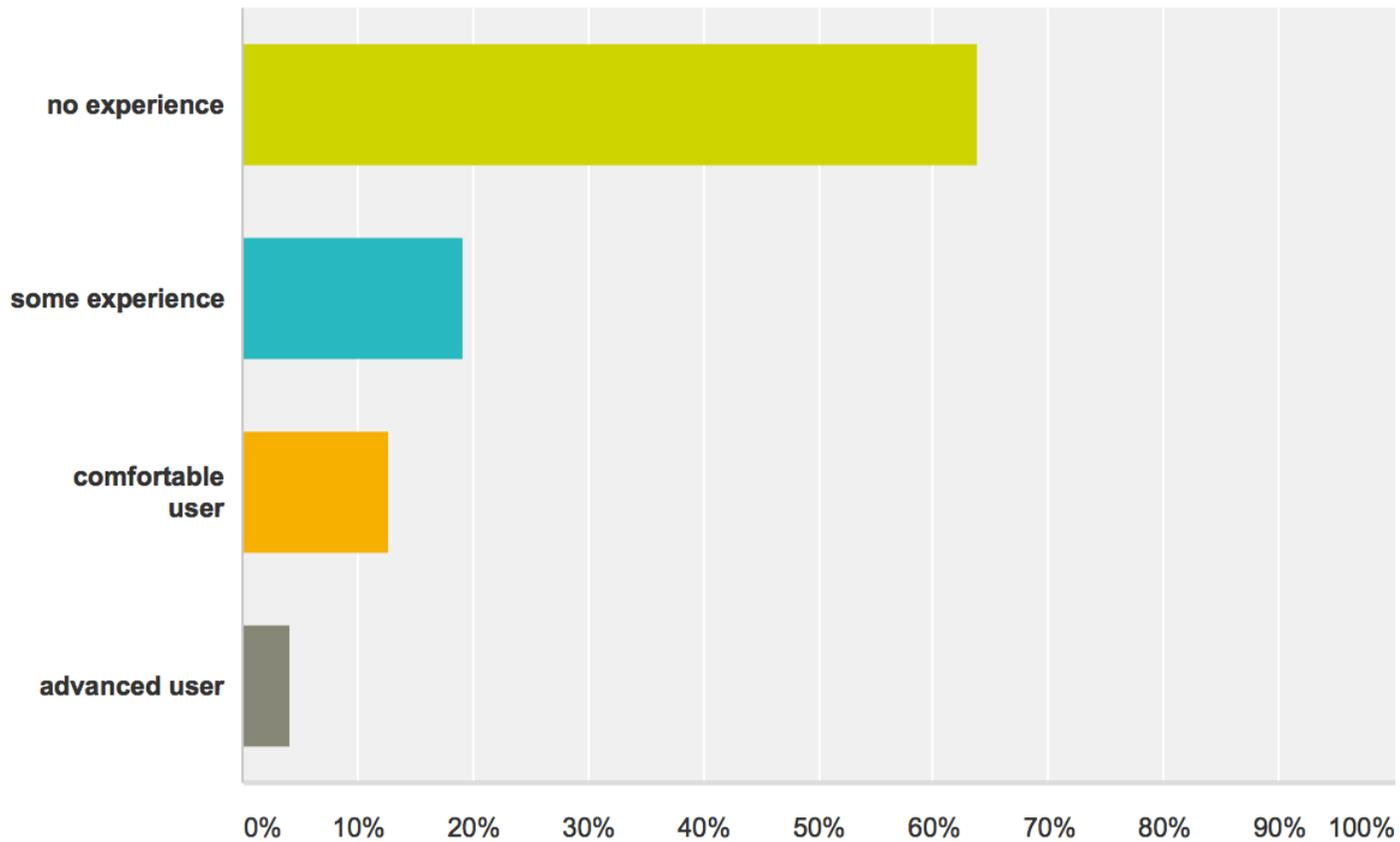
Workshop Survey Results

What analysis software do you intend to use for your research and why? Mark all that apply and please comment.
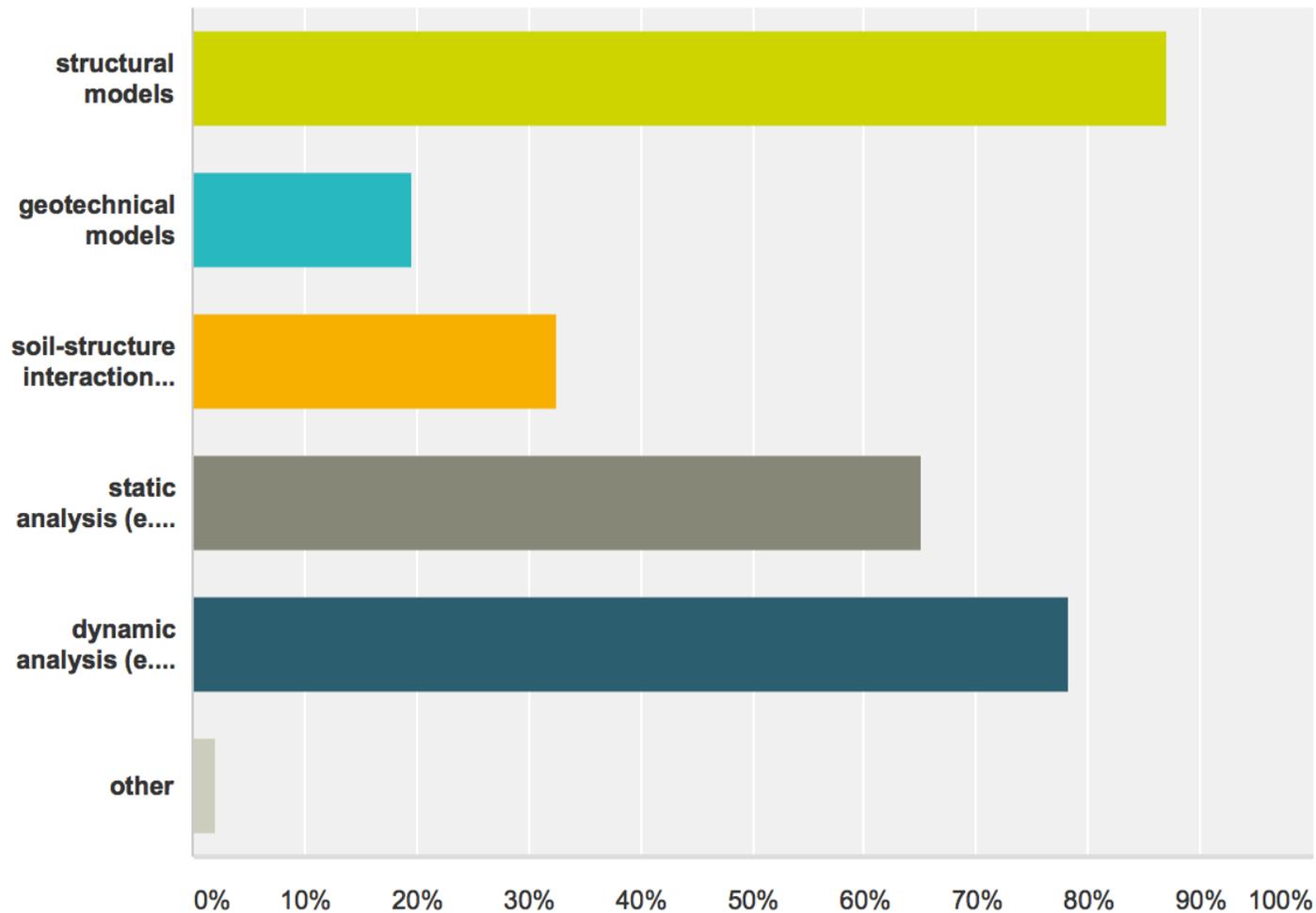
Answered: 44   Skipped: 3

Workshop Survey Results

QuakeCoRE
NZ Centre for Earthquake Resilience

**What types of models are you interested in?
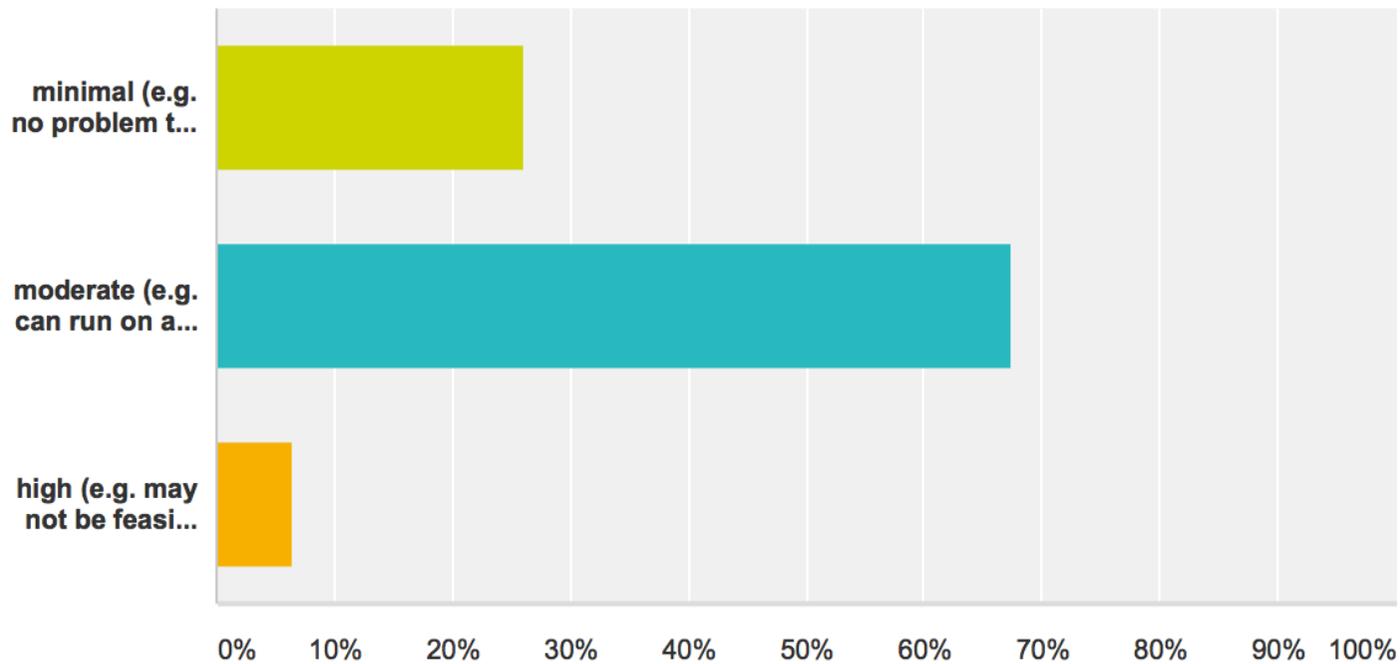Mark all that apply and comment as needed.**

Answered: 46   Skipped: 1

Workshop Survey Results

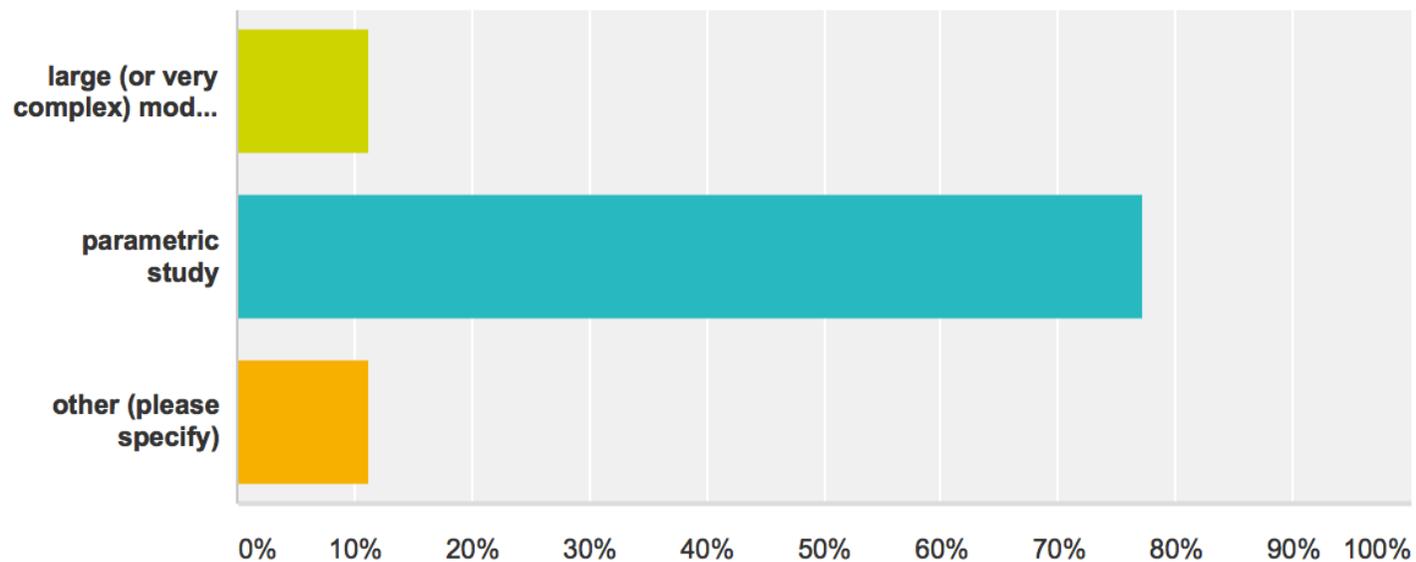What is the expected level of computational demand for your work?

Answered: 46   Skipped: 1

Workshop Survey Results

What is the main driver behind the computational demand associated with your expected analysis?
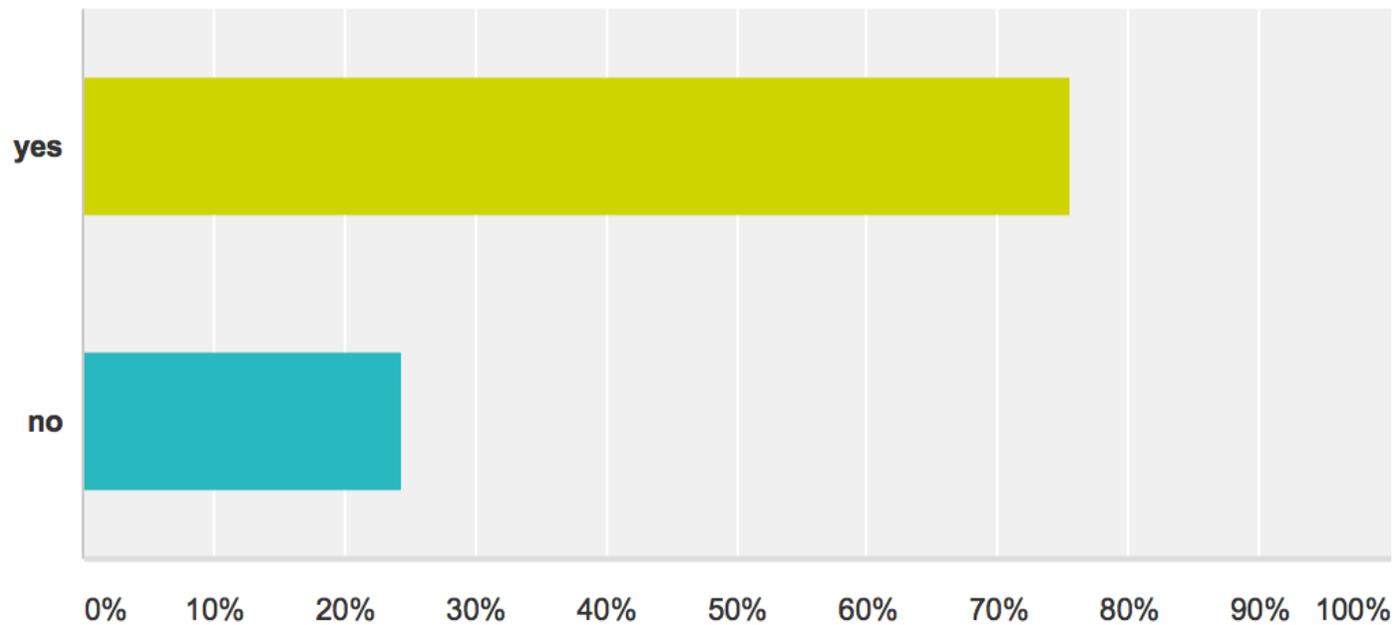
Answered: 44   Skipped: 3

Workshop Survey Results

Do you have any interest in utilizing high performance computing resources?
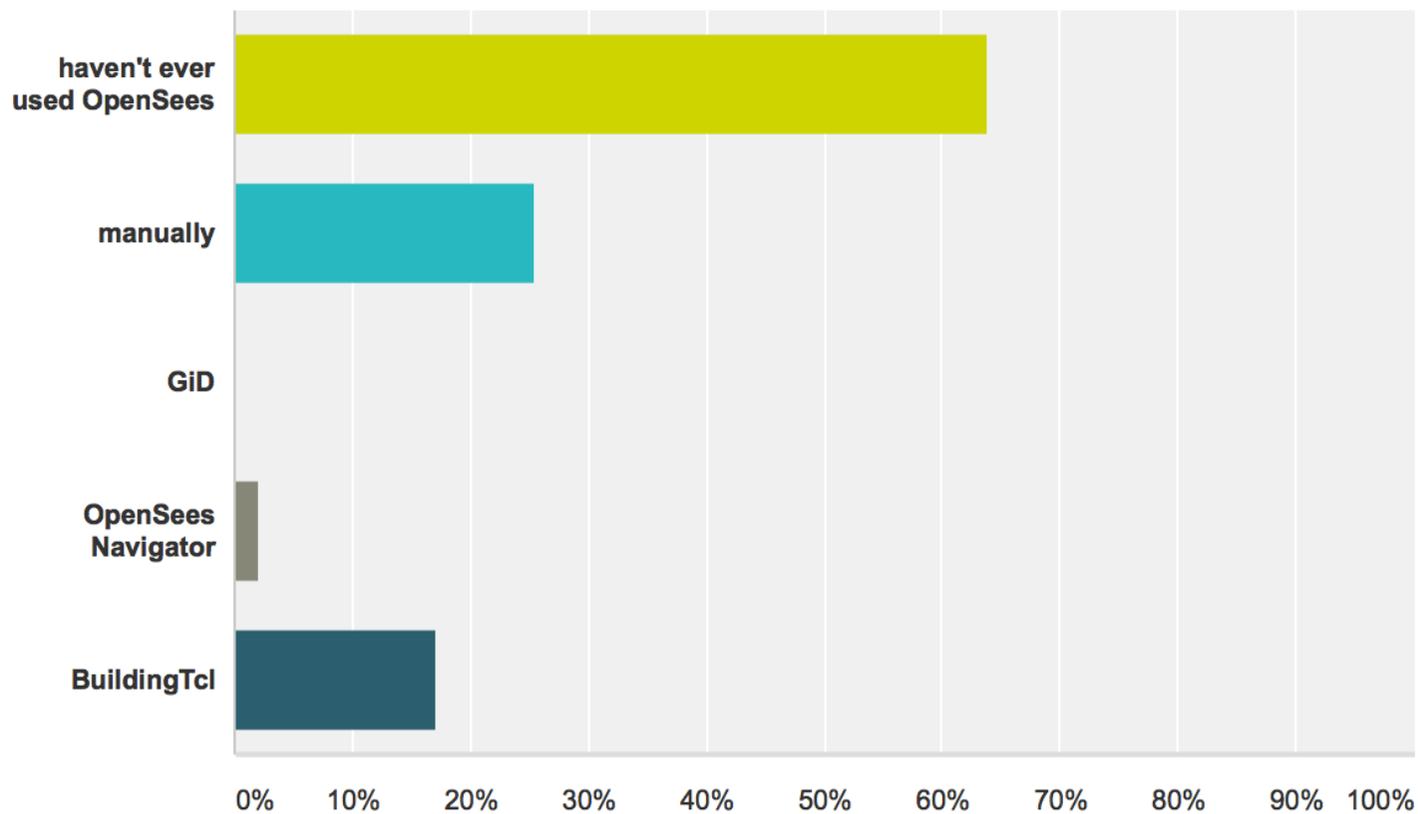
Answered: 45   Skipped: 2

Workshop Survey Results

If you use (or have used) OpenSees, how do you create your model (pre-processing)?

Answered: 47   Skipped: 0

Workshop Survey Results

If you use (or have used) OpenSees, how do you post-process and visualize your results?

Answered: 45   Skipped: 2
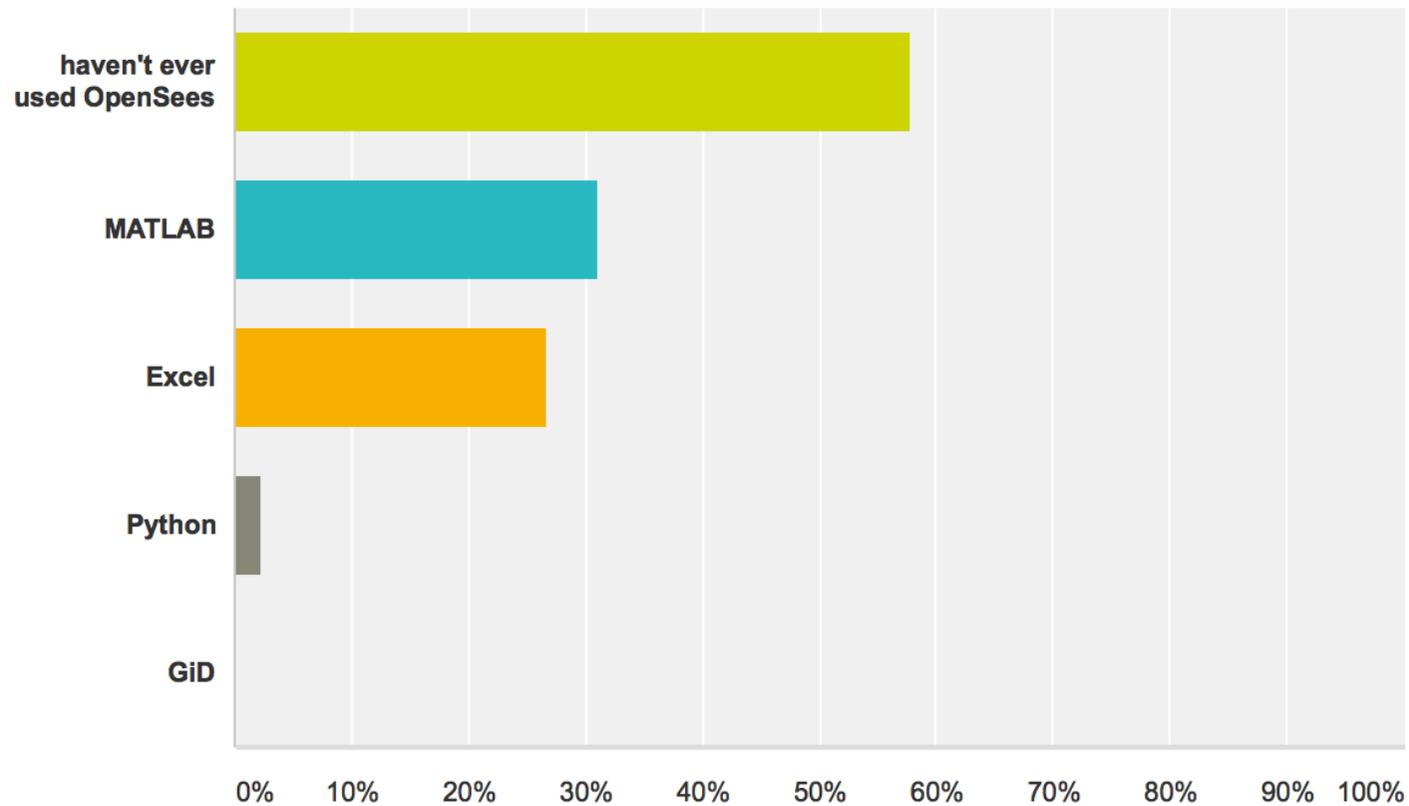
Workshop Survey Results

If you use (or have used) OpenSees, what types of improvements would you like to see to improve the ease of use and/or performance of OpenSees? Mark all that apply and please provide comments.

Answered: 31   Skipped: 16
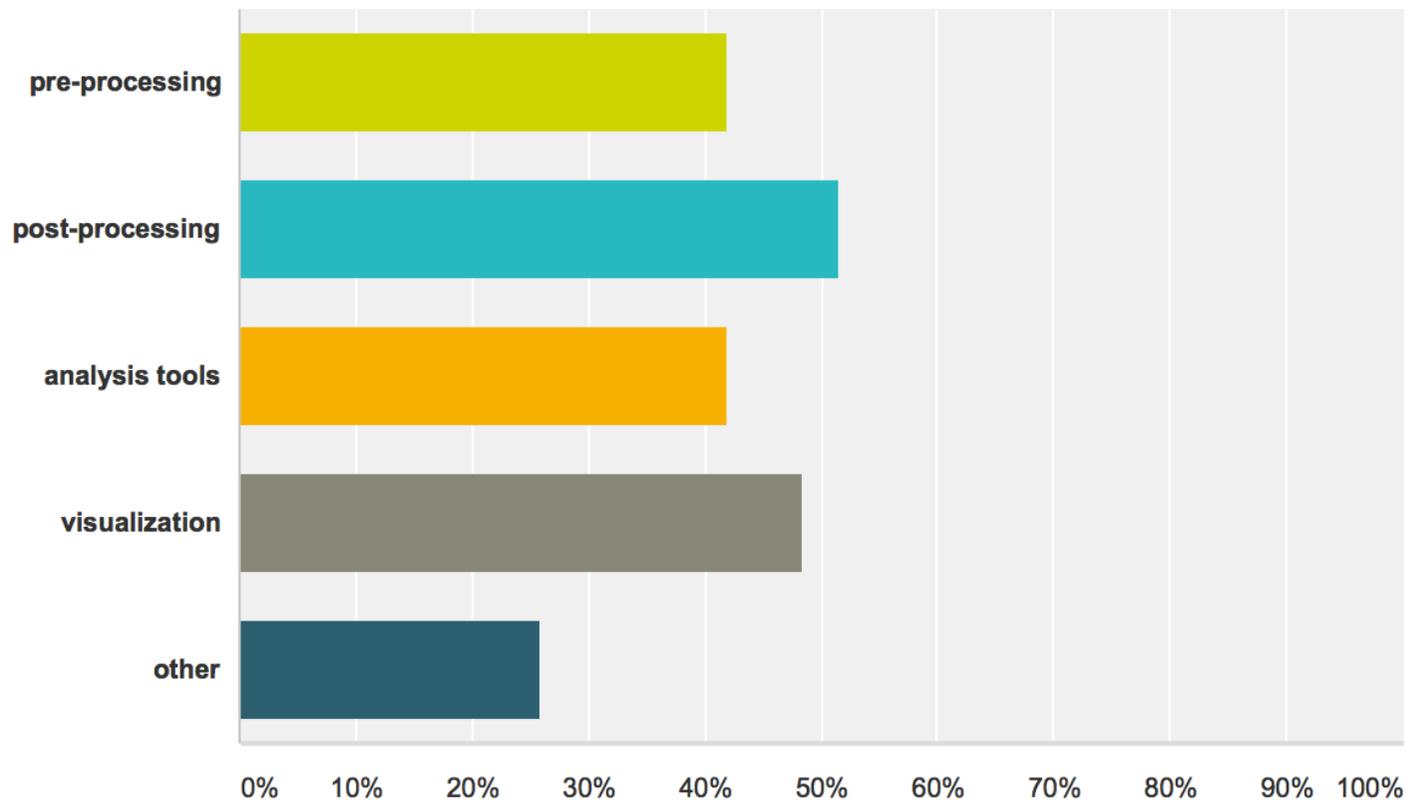
Workshop Survey Results

Which topic in the recent OpenSees workshop did you find the most useful? Mark as many as you see fit and please comment

Answered: 22   Skipped: 0
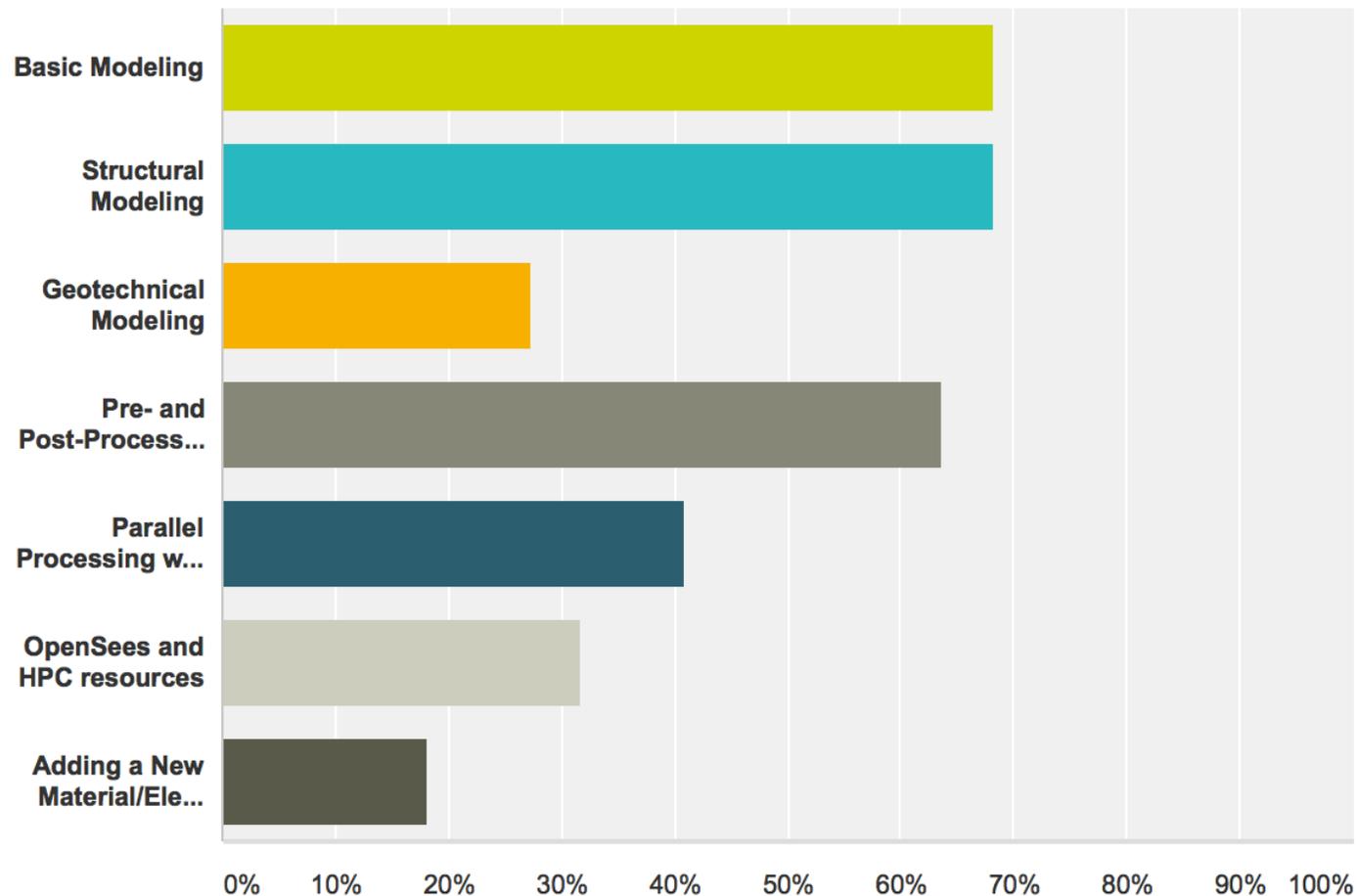
Workshop Survey Results

Summary – Who comprises the QuakeCoRE OpenSees research community?

- Largely composed (80%) of users with little or no experience with OpenSees

- Predominantly structural analysis

- The computational scope of most of the work is moderately demanding, with parametric studies comprising the main source of computational demand

- No consensus pre/post-processing tools or strategies in use throughout the community – more of a mix of different things

- Desire for improvement/assistance nearly equally in each of:
  - Pre-processing
  - Analysis tools
  - Post-processing
  - Visualization

Student Innovation Prizes

Two $500 prizes will be awarded at the 2016 QuakeCoRE Annual Meeting recognizing significant earthquake engineering research that has been undertaken using the OpenSees finite element analysis platform.

Submissions will be accepted at the same time as abstracts for the QuakeCoRE Annual Meeting. Potential submission content includes, but is not limited to:

1. Large, complex, and computationally intensive applications of OpenSees that involve innovative applications of modeling tools;

2. Implementation of new constitutive models, elements, solvers, or other computational tools into the OpenSees framework;

3. Community contributions such as the development of pre- and post-processing tools beneficial for general analysis or comprehensive example analyses that explain in detail how to model specific useful structural and geotechnical problems.

Student Innovation Prizes

Submissions take the form of a research poster that explains the overall project associated with the OpenSees development/application including some discussion on the particular OpenSees usage/development in the work.

- Register your interest to submit to christopher.mcgann@canterbury.ac.nz prior to **5 August 2016** (deadline for QuakeCoRE abstract submissions)

- If you are presenting a poster at the annual meeting, this poster can serve as your submission, but be sure to provide notification of your interest in submitting to the competition by the deadline noted above.

- For those who are not presenting a poster at the meeting, please prepare a poster and submit to christopher.mcgann@canterbury.ac.nz before 31 August 2016
  - Posters in A0 landscape format - electronic submission

The winning submissions will best fit the judging criteria of

- significant and/or practically-useful contribution to earthquake engineering analysis using OpenSees

Community Input

We know a bit from the surveys and through discussions associated with the training workshops earlier this year, but where do we specifically stand as a research community?

- Name – Location/School – Topic

	Primary Analysis/Simulation Type		
	Structural	Soil-Structure Interaction	Geotechnical
Large single model (or limited param. study)		**Bilel Ragued**, UA PhD, 2D site-response/SSI study of Lyttelton port wharf structure (includes param study aspects)	**Seokho Jeong**, UC Postdoc, 2D/3D site response analysis at Heathcote Valley
Simpler model(s), with large parametric study	**Jarrod Cook**, UC PhD, Tension-only brace w/ ratcheting **Reagan Chandramohan**, Stanford PhD soon UC Postdoc, very large parameter study for structural systems (considers performance and loss assessment) **Masoud Moghaddasi**, UC/UA Postdoc, large parameter study for typical NZ structural systems to assess performance and loss region-specifically	**TBD**, UA PhD, 2D SSI models assessing effects of ground improvement on motions transferred to structure **TBD**, UA PhD, dynamic bridge analysis with SSI springs	**Kevin Foster**, UC PhD, site-response analysis using KiK-net downhole data **Hannah Dawson**, UA PhD, site-response analysis for range of profiles in Auckland area (fits btwn current and above cells)
Performance or loss assessment	**Karim Tarbali**, UC PhD, assessing demand and performance of SDOF/MDOF subject to directivity motions		

Community Input

What are your aspirations based on what is achievable in your analysis?
- Where are you currently and where do you want to be?
- What assistance may you need in order to achieve these goals?

	Goals for Analysis/Simulation		
	Now	6 months	18 months
Jarrod Cook	Have been modeling things in MATLAB, just starting to transition to OpenSees	Have parameter study up and running in OpenSees, working on increasing model complexity	Potential for larger, more complex, model to recreate shake table testing that may be done
Kevin Foster	Not started yet, in planning stages	Have parameter study up and running in OpenSees	Consideration of bi-directional shaking in context of soil column
Karim Tarbali	Finished with analysis for PhD	May apply concepts from research on SDOF/MDOF to other engineering systems (e.g. geotechnical, SSI)	
Seokho Jeong	1D/2D site response analysis of Heathcote Valley considering horizontal input motions	Examine soil response in Heathcote Valley to vertical input motions	Topographic amplification study for Port Hills, may consider 2D OpenSees studies
Hannah Dawson	Starting modeling soon, currently defining soil profiles from Vs data	Have site-response modeling effort well underway	Hopefully finished with modeling and wrapping up PhD
Bilel Ragued	Finishing very soon		
Reagan Chandramohan	Finishing PhD research (Stanford)	Extend framework from PhD to other systems (e.g. geotech, SSI), start becoming an OpenSees developer	
Masoud Moghaddasi	Running parameter study to assess effect of GM uncertainty on structural response	Start considering Monte Carlo simulations to account for uncertainties in the structure itself	

Thank you!

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