QuakeCoRE OpenSees Monthly Webconference
11 April 2017

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

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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

- Training and user support to reduce barrier for entry

QuakeCoRE and OpenSees

What are we working on right now?

- Workshops and monthly webconferences

- Pre- and Post-Processing Tools for 1D site response analysis
  - Identified from community input last year
  - Formal roll-out coming soon via wiki page

- Workflow optimization for parallel applications of OpenSees
  - Parallel analysis of very large models (OpenSeesSP)
  - Parallel analysis for parameter studies (OpenSeesMP)

QuakeCoRE and OpenSees

What else?

- Up-to-date versions of the code
    - Pre-compiled Windows executables
    - Assistance with compiling your own version
    - Additions to the main source code?

- Access to NeSI allocation on Pan cluster for using OpenSees with HPC
    - Great resource for those with a large parameter study (or similar)

- We want to hear from you! What else might be helpful?

- OpenSees Development page on QuakeCoRE wiki – updates and further info

https://wiki.canterbury.ac.nz/display/QuakeCore/OpenSees+Development

QuakeCoRE and OpenSees

What might we do in the future?

- Repository of OpenSees models

- Pre- and Post-Processing Tools for other types of analysis

- We want to hear from you! What are you working on and how do you see QuakeCoRE support fitting-in with your work?

- **Action Item(s):**
    1. General research plan for OpenSees analysis (3-4 lines)
    2. What baseline scripts do you think QuakeCoRE could develop to help you with your work?
    3. What scripts/tools do you intend to develop (or already have) which, with some possible modification/improvement, could be useful to the general community?
    4. What things do you think are specific to your problem (i.e., likely won't benefit anyone else to spend time here)?

QuakeCoRE OpenSees Workshop Recap – 2017

2017 OpenSees Workshops

The 2017 round of workshops were held in March in both Christchurch and Auckland, with a two-day format.

- Day 1: Beginning with OpenSees
- Day 2: Advanced Simulation with OpenSees

Thank you to all of the attendees. Feedback on these workshops is welcome. If you have any comments or reflection, please send them via email to christopher.mcgann@canterbury.ac.nz

Reminder that all of the workshop materials are made available on the QuakeCoRE wiki page at:

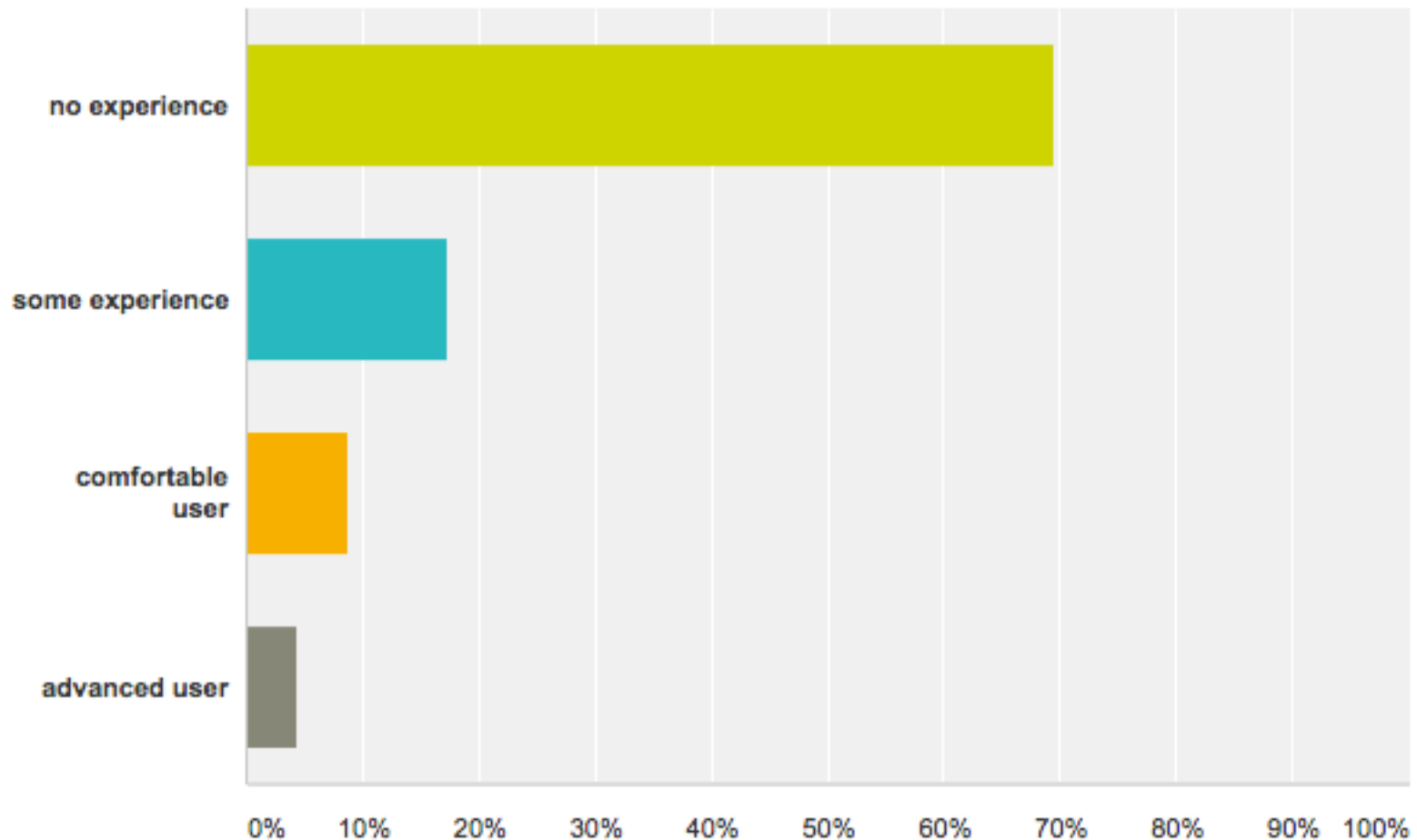https://wiki.canterbury.ac.nz/display/QuakeCore/OpenSees+Training+Workshops+-+2017

Who makes up the QuakeCoRE OpenSees community?
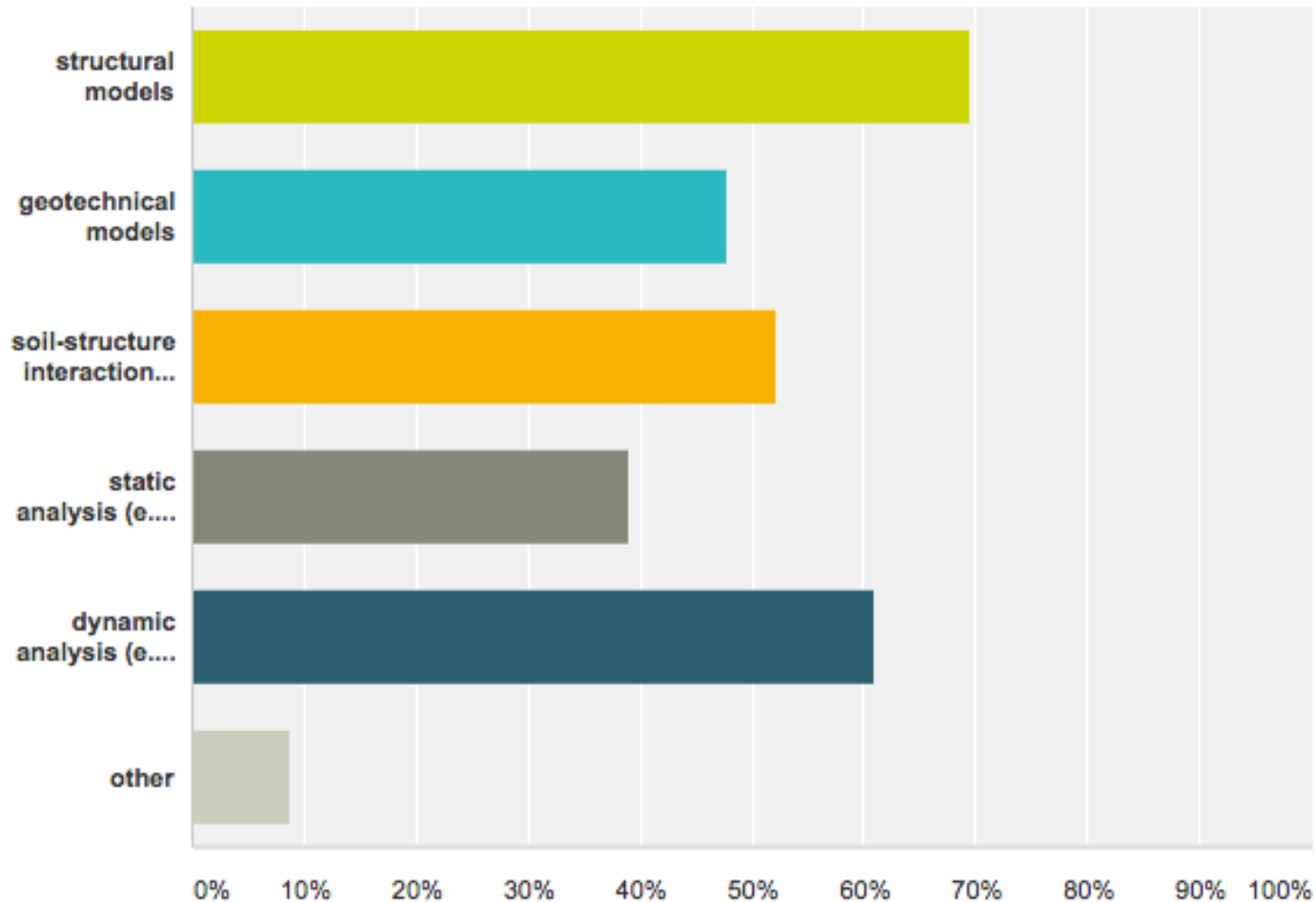
2017 OpenSees Workshops

2017 OpenSees Workshops

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

Answered: 23   Skipped: 0

2017 OpenSees Workshops

Who makes up the QuakeCoRE OpenSees community?

- Largely composed (~70%) of users with little or no experience with OpenSees

- Structural analysis more prevalent, but reasonable mix across boundaries

- 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
  - **Pre-Processing:** Manual model creation prevalent
  - **Post-processing:** Various tools in use
    - MATLAB
    - Excel
    - Python
    - GiD
    - Mathcad

Thank you!

www.quakecore.nz