

# USER: Undergraduate Studies in Earthquake Resilience

LINK: <https://tinyurl.com/qcuser2020>

USER is a summer research programme led by QuakeCoRE: The NZ Centre for Earthquake Resilience ([www.quakecore.nz](http://www.quakecore.nz)) at the University of Canterbury. The aim of the USER programme is to provide multi-disciplinary research opportunities for undergraduate (UG) students to become exposed to various aspects of the earthquake resilience problem.

The programme is open to UG students from science, engineering, social science, and creative arts disciplines. We believe that two differentiating factors in our programme for UG research is: (1) a large collection of students from a variety of different disciplinary background who forge collaborations via a 'grand challenge' problem related to Earthquake Resilience in New Zealand; and (2) students have access to the network of NZ's leading researchers, who are members of QuakeCoRE, and who will collectively provide mentoring to students as well as guest lectures and field trips.

## 2020/2021 Grand Challenge:

For the 2020/2021 summer period the USER Grand Challenge is: 'Modelling, visualising, and communicating future major earthquakes and their impacts to the New Zealand public'. QuakeCoRE researchers have recently developed models of over 500 different major earthquakes that might occur in the near future in New Zealand and undertaken advanced simulations (using NZ's largest supercomputers) which predict how strong the ground will shake in each earthquake (e.g. such as this video: <https://www.youtube.com/watch?v=j9c-Fwhaigc>), and the aim of the USER Grand Challenge is to:

(click on the links below to view and edit tasks)

**(1) Modelling:** Use existing models to determine the consequent liquefaction, landslides, building and bridge damage, highway/pipeline/telecommunication systems damage, and socio-economic impacts. (students with background in Science, Engineering, Social Science).

**(2) Visualisation:** Develop and use computational visualisation tools to convey the earthquakes, their ground shaking, and the modelled impacts (students with background in Mathematics, programming, computer science).

**(3) Communication:** Use one of more audio-visual methods to develop materials (e.g. posters, videos, podcasts, blogs, webpages) which can be used to efficiently and effectively communicate to the general public (students with background in the creative and performing arts, hazard management, social science).

## Field trips:

As part of the USER programme students will get to experience one of two field trips:

(1) '*Looking for faults in the Canterbury region*': This field trip will involve travelling from Christchurch to the Canterbury foothills, Kaikoura region, and Southern Alps to examine areas which clearly showcase active tectonics in the landscape. This fieldtrip will be led by researchers who have decades of experience in identifying and characterising faults, including research following the 2016 Kaikoura earthquake.

(2) '*Earthquake-resistant design of NZ infrastructure*': This field trip will involve visiting several buildings that have been constructed in Christchurch that make use of a range of different structural systems for designing buildings to mitigate the effects of earthquakes (such as base isolation, steel and concrete buildings), and also geotechnical foundation design to mitigate the effects of liquefaction.

## Project duration:

The programme runs for 10 weeks in the following blocks:

16th November - 18th Dec (5 weeks)

4th Jan - 5th Feb (5 weeks)

(there is some flexibility in these dates to satisfy prior constraints that people may have).

## Scholarship amount and practical work:

- The USER programme is an recognised UC Summer programme. Further details can be found at the link below.
- This summer programme can be credited toward **Engineering degree practical work requirements**
- Note that we will accept students that are 2nd, 3rd or 4th year of an UG degree.

## Application:

Applications are due Friday 4th September at midday.

Apply here: [this form](#).

Contact:

Further information can be found [here](#) and [here](#).

For any other enquiries please contact:

Brendon Bradley ([UC website](#))

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