

USER: Undergraduate Studies in Earthquake Resilience

USER is a summer research programme led by QuakeCoRE: The NZ Centre for Earthquake Resilience (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 for up to 10 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:

- (1) Improve the prediction of earthquake-induced ground shaking through model representation of new sedimentary basins, and near-surface geotechnical conditions. **(students with background in Science, Engineering)**
- (2) 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).**
- (3) Apply Machine Learning methods to develop surrogate models from large datasets of simulation results. **(students with background in Engineering, Mathematics, programming, computer science).**
- (4) Use computational visualisation tools to convey the earthquakes, their ground shaking, and the modelled impacts **(students with background in Mathematics, programming, computer science).**
- (5) 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).**

Dates:

The project runs for 10 weeks from 16/11/20-5/2/21 (breaking from 18/12/20-4/1/21). There is some flexibility in these dates to satisfy prior constraints that people may have.

Application form:

Applications are due Friday 4th September at midday.

Apply here: **this form**.

<https://wiki.canterbury.ac.nz/display/QuakeCore/USER%3A+Undergraduate+Studies+in+Earthquake+Resilience>