SUPERVISOR/S: Megan Boston
PROJECT TITLE: Advancing NZ Hospital Seismic Readiness: Creating a Post-Earthquake Functionality Dashboard
FIELD: Civil Engineering
DIVISION/SCHOOL: HECS - School of Engineering
PROJECT LOCATION: Hamilton

PROJECT ABSTRACT:
Continued functionality of critical infrastructure systems, buildings, or facilities shortly after an earthquake is expected. However, experience indicates that there may be some disruption due to damage, outages, or access. Disruptions vary in size and duration. While damage to structural components can have significant life safety and economic implications, damage to non-structural components or failures of the interconnected and interdependent supporting infrastructure systems can also have a substantial impact on the operability.

A method to rapidly identify how damage, outages, or blockages are linked to drops in functional performance measures for the people and organisations that rely on the infrastructure is needed. Immediate understanding of damage and the subsequent effects of the damage will provide instant feedback on the level of operational functionality.

This project will work towards quantifying functionality linkages between three critical aspects of a hospital: space, stuff, and staff. The space component will examine how physical damage can disrupt the ability to perform basic and complex medical procedures or interfere with general patient care. Space will consider the physical plant, as well as external disruptions that could impact the ability to use the space including utilities or medical gases. The stuff component will assess the availability of supplies necessary for different medical procedures consider what is available onsite, the supply chain, and the ability to sterilize equipment. The staff component will consider staff availability and potential shortages due to access issues or disruptions to the transportation network.

This project will also create a wireframe for a functionality dashboard for a hospital ward based on the unique properties and requirements for full or reduced functionality considering space, staff and stuff. The dashboard will provide rapid visual indications of functionality based on measured and observed damage. The dashboard will be supported by a dynamic risk analysis toolset used to quantify the level of damage to the corresponding reduction in hospital services.

STUDENT SKILLS:
- Civil engineering
- Data collection/database
- Basic programming

PROJECT TASKS:
- Work with ADHB and WDHB to gather information on general hospital functionality requirements
- Collate data from past earthquake that related physical damage to hospital functionality
- Analyze the collected data and create linkages between damage to disruption to staff, stuff, or space
- Create a wireframe for a hospital functionality dashboard
- Create a research poster

EXPECTED OUTCOMES:
- Student’s Research Poster (as per clause 6 of the Scholarship regulations)
- A database linking physical damage to disruptions to staff, stuff, or space components of a hospital
- A wireframe hospital functionality dashboard