University of Auckland Centre for Earthquake Engineering Research (UACEER)
Department of Civil and Environmental Engineering
Public Lecture

EARTHQUAKE ENGINEERING IN A FLAT WORLD: IMPROVING THE PERFORMANCE OF CIVIL INFRASTRUCTURE

Prof. Ian Buckle
University of Nevada Reno, USA

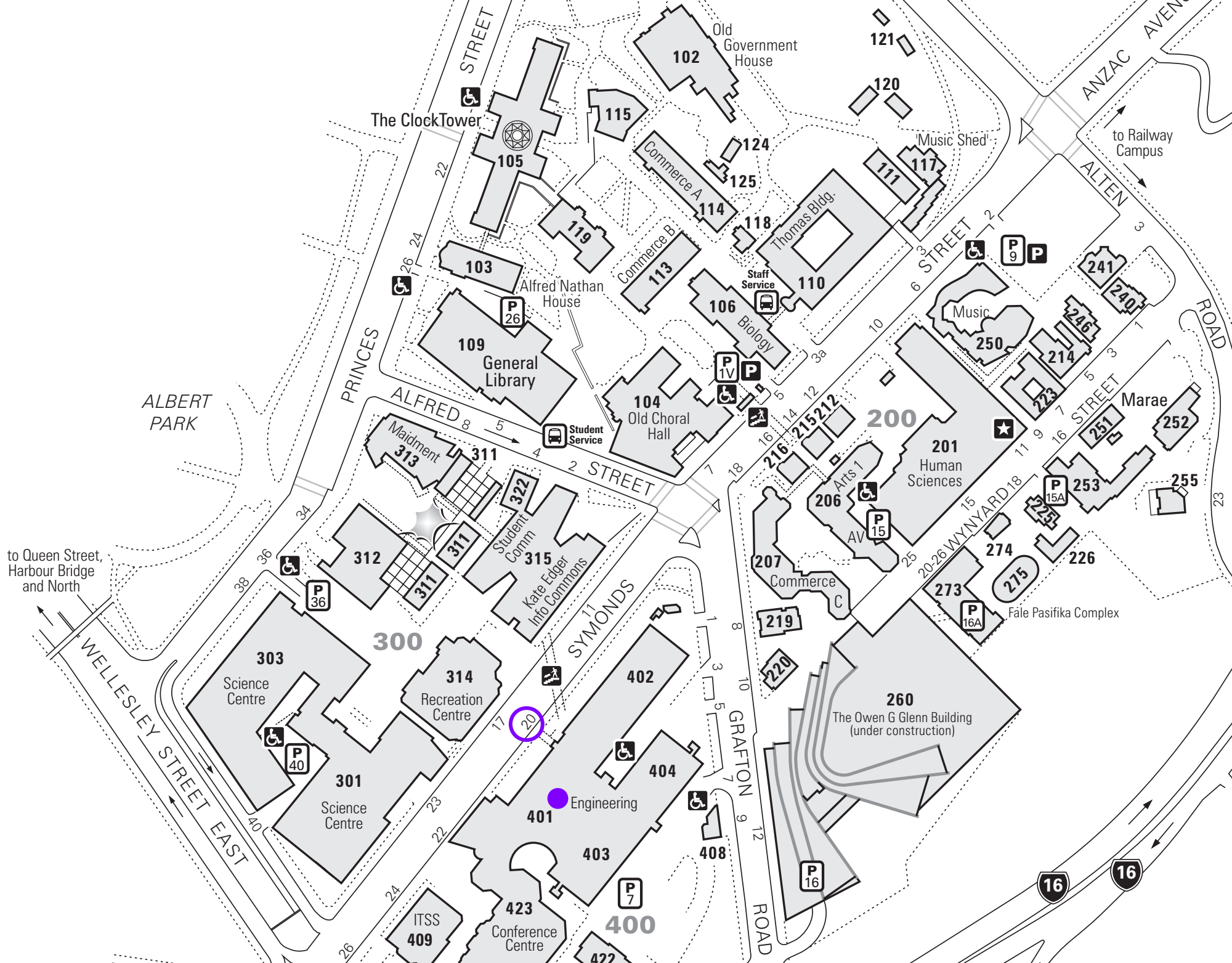
Date: Thursday, 24 May 2012
Time: 18:00-19:30
Venue: Eng1401/401-401 (**Faculty of Engineering, 20 Symonds Street)**

Abstract:
Earthquake engineering is one of the most challenging disciplines in modern society. Just when life-safety during an earthquake has become an achievable goal, the bar has been raised to continuing functionality. The advent of sophisticated computational tools, backed up by experimental validation, has given confidence that buildings and bridges can be designed to protect life and limb. Building codes and standards promote life-safety as their primary goal. Structures may need to be demolished after the design earthquake, but occupants should be able to walk away. However the economic costs of business disruption due to loss of function can be crippling, not just in the epicentral region but nationally and globally. This is because we live in a flat world where the interconnectedness of society greatly expands the affected area and a local disaster can quickly become a national/global one. This in turn leads to an escalation in financial losses not seen a decade ago. What was 'acceptable' damage in the 1990s is no longer acceptable. This painful lesson has led to the concept of 'performance-based' design (PBD) – a range of performance levels is offered for the owner's selection. But barriers to implementation are many and research is required to deliver on the promise of PBD. The problem is further compounded by the need to contain costs. Current efforts applying PBD to civil infrastructure in the U.S. are focused on new materials and innovative technologies. Large-scale experiments have recently been conducted on multi-span bridge systems with shape memory alloys in plastic hinges zones, and/or protective systems in the superstructures. Both show great promise in reaching the goal of damage-free behavior, even in earthquakes larger than the design-basis earthquake. To be fully effective however, these techniques require an improved understanding of soil-structure interaction, particularly at the abutments, and this topic should be the subject of an accelerated, large-scale, research program.

Biography:
Dr Ian Buckle is the director of the Center for Civil Engineering Earthquake Research and Foundation Professor at the University of Nevada, Reno. He has previously served as Deputy Vice-Chancellor (Research), University of Auckland, New Zealand, and as Deputy Director of the National Center for Earthquake Engineering Research, University at Buffalo, New York (now the Multidisciplinary Center for Extreme Events Research). He is currently President-Elect of the Earthquake Engineering Research Institute. Dr Buckle directs the Large-Scale Structures Laboratory at Reno, which houses a multiple shake table facility, one of the fourteen Equipment Sites established in 2004 by the National Science Foundation in the George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES). Dr. Buckle's research interests include seismic performance of bridges, lifelines and buildings; design and retrofit criteria for bridges; earthquake protective systems for bridges; bridge performance for extreme loads such as earthquake, differential temperature, and overload; and nonlinear analytical techniques for structures subject to dynamic loads. He has conducted full-scale field testing and large-scale laboratory testing of structures using static and dynamic loads; has been a member of earthquake reconnaissance teams in California, Japan, Taiwan, and Chile; and has conducted short courses in bridge engineering, seismic retrofitting, and the seismic isolation of highway bridges.

Note: The lecture will be preceded by a 20-min presentation on "Introduction to holistic research in Earthquake Engineering at the University of Auckland" by AP Nawawi Chouw (Director of UACEER) and Dr Rolando Orense (Leader of the Geomechanics Group) and followed by a discussion session. Everybody is invited to enjoy nibbles and drinks from 5.30pm at the Neon Foyer/401-400L4.

For enquiries, please contact: Assoc. Prof. Nawawi Chouw (n.chouw@auckland.ac.nz)


The ClockTower
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Old Government House
102
115
121
120
124
125
Commerce A
114
Music Shed
111
117
Thomas Bldg.
110
118
119
Commerce B
113
Staff Service
106
Biology
103
Alfred Nathan House
109
General Library
104
Old Choral Hall
Student Service
Maidment
313
311
322
Student Comm
315
Kate Edger Info Commons
312
311
311
300
303
Science Centre
314
Recreation Centre
301
Science Centre
402
404
401
Engineering
403
408
423
Conference Centre
ITSS
409
400
422
200
201
Human Sciences
Arts 1
206
AV
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Commerce C
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220
260
The Owen G Glenn Building (under construction)
Music
250
241
240
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223
Marae
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255
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273
Fale Pasifika Complex
216
215
212
PRINCES STREET
ALFRED STREET
SYMONDS STREET
GRAFTON ROAD
WELLESLEY STREET EAST
WYNYARD
ALTEN ROAD
ANZAC AVENUE
ALBERT PARK
to Railway Campus
to Queen Street, Harbour Bridge and North
16
16