

Transport Resilience Research

Event: RNC Infrastructure Research Day

Date: 22 November 2022

Venue: The University of Auckland

Speaker: Assoc. Prof. Seosamh Costello



THE UNIVERSITY OF
AUCKLAND
Te Whare Wananga o Tamaki Makaurau
NEW ZEALAND

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QuakeCoRE
NZ Centre for Earthquake Resilience

Research Team



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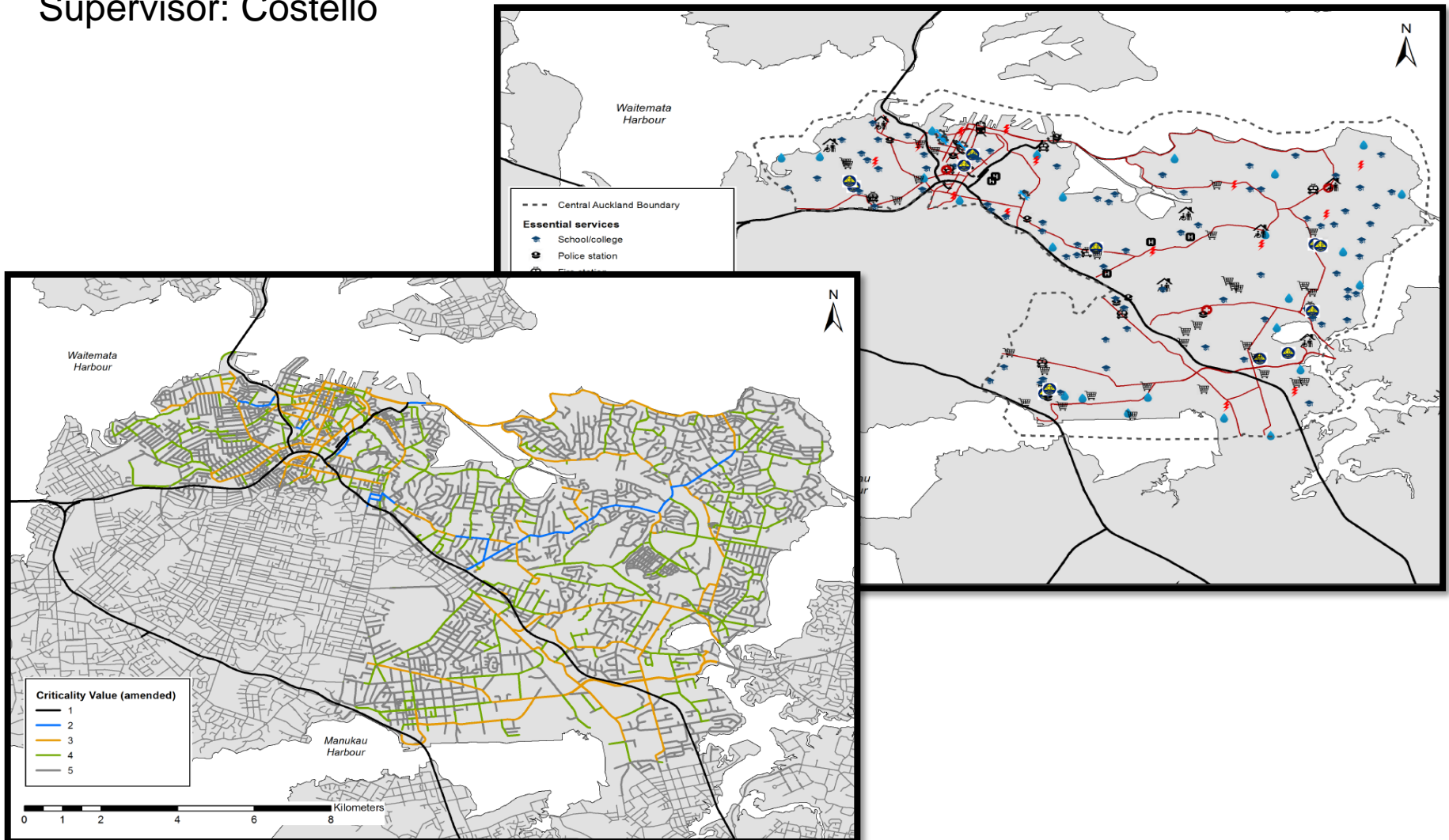


Previous Research



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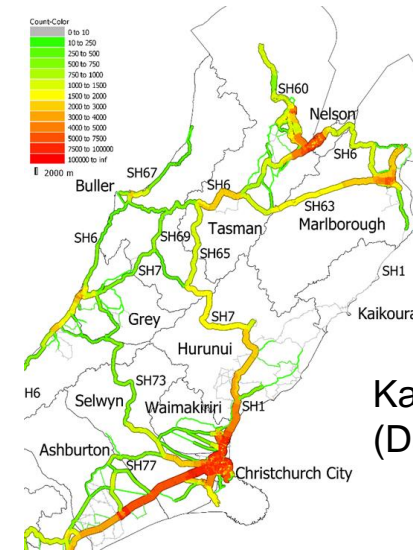
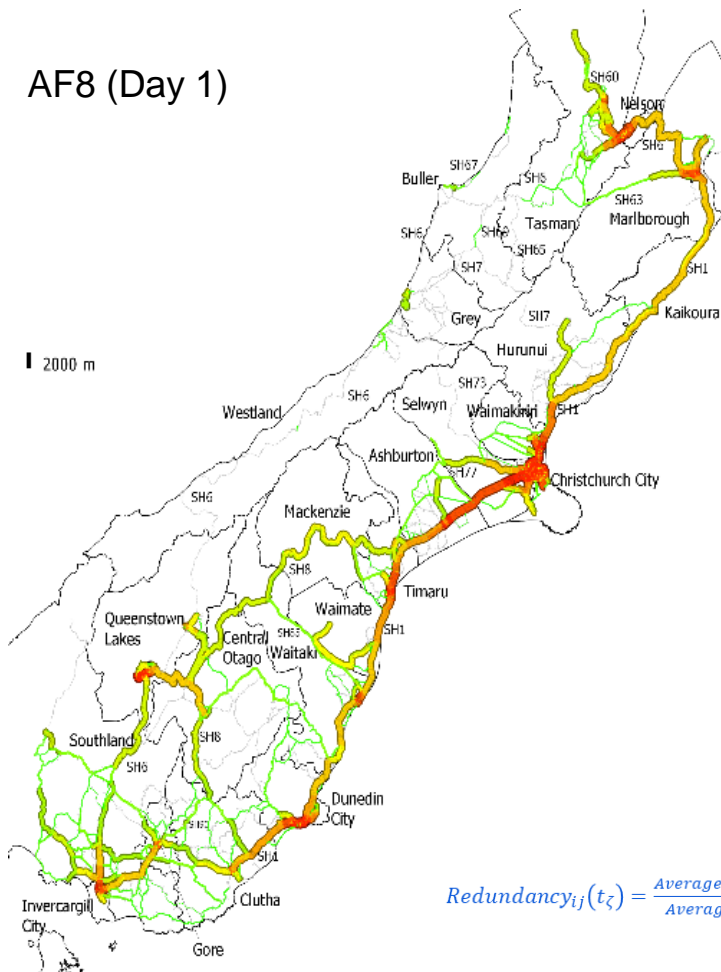
BE(Hons) Students: Kester Rebello and Karan Jaggi
Supervisor: Costello



Simulation Model and Trip Resilience

PhD Student: Mohammad Aghababaei
Supervisors: Costello and Ranjitkar

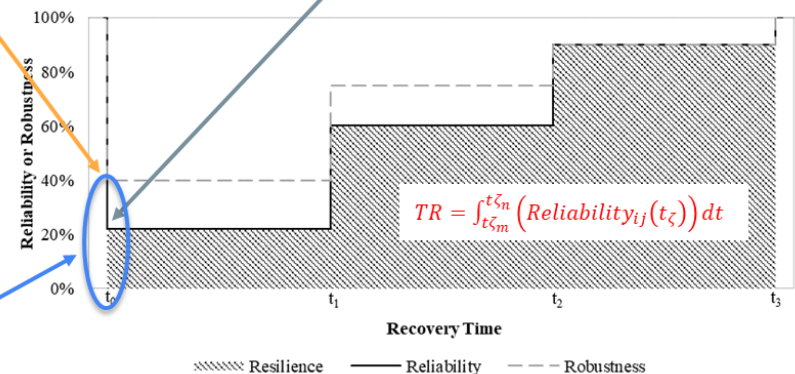
AF8 (Day 1)



Kaikoura EQ (Day 8)

$$Robustness_{ij}(t_\zeta) = \frac{Flow_{ij}(t_\zeta)}{Flow_{ij}(BAU)}$$

$$Reliability_{ij}(t_\zeta) = Robustness_{ij}(t_\zeta) * Redundancy_{ij}(t_\zeta)$$



$$Redundancy_{ij}(t_\zeta) = \frac{Average\ Travel\ Time_{ij}(BAU)}{Average\ Travel\ Time_{ij}(t_\zeta)}$$

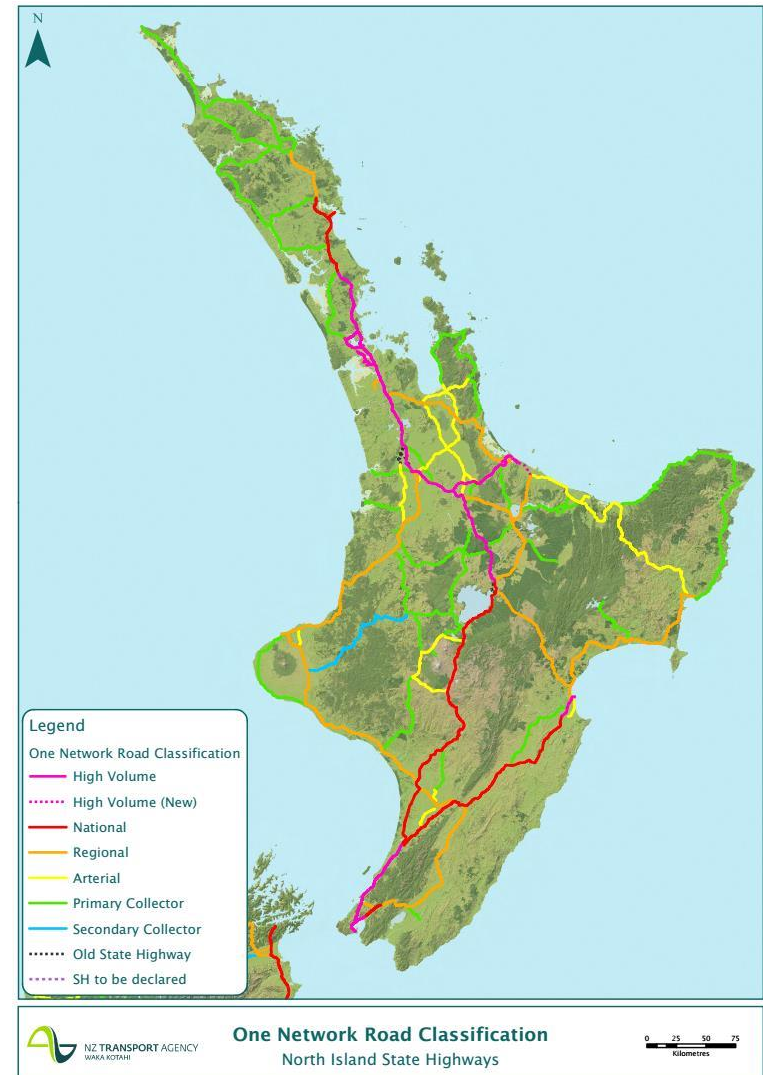
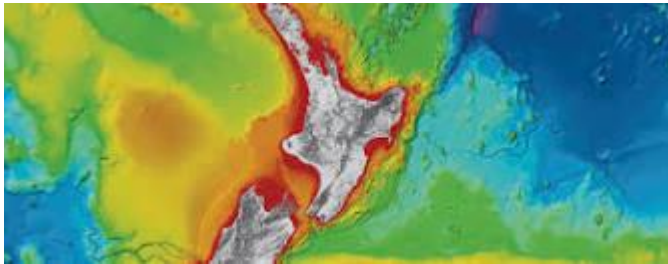
Current Research



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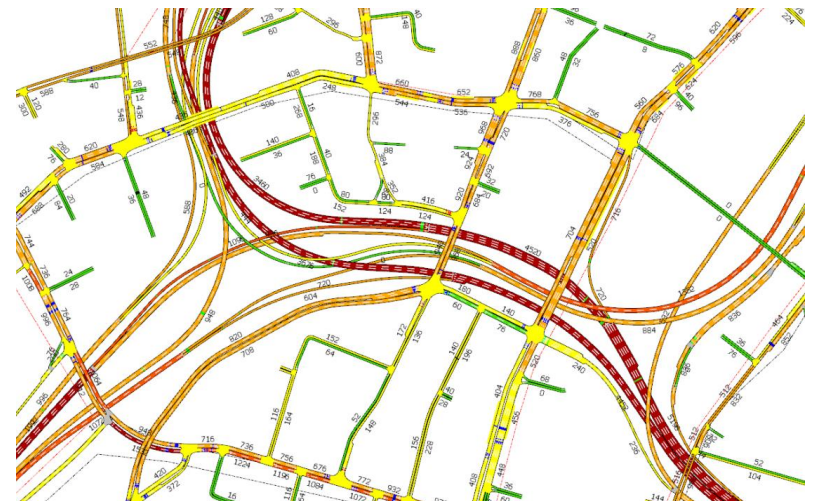
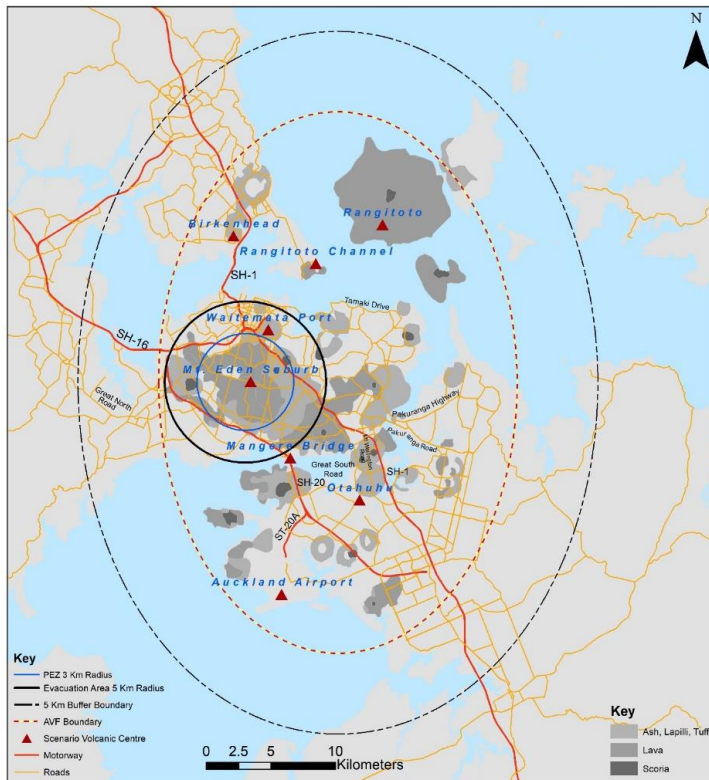
North Island Simulation Model

PhD Student: Anish Kadka
Supervisors: Ranjitkar and Costello



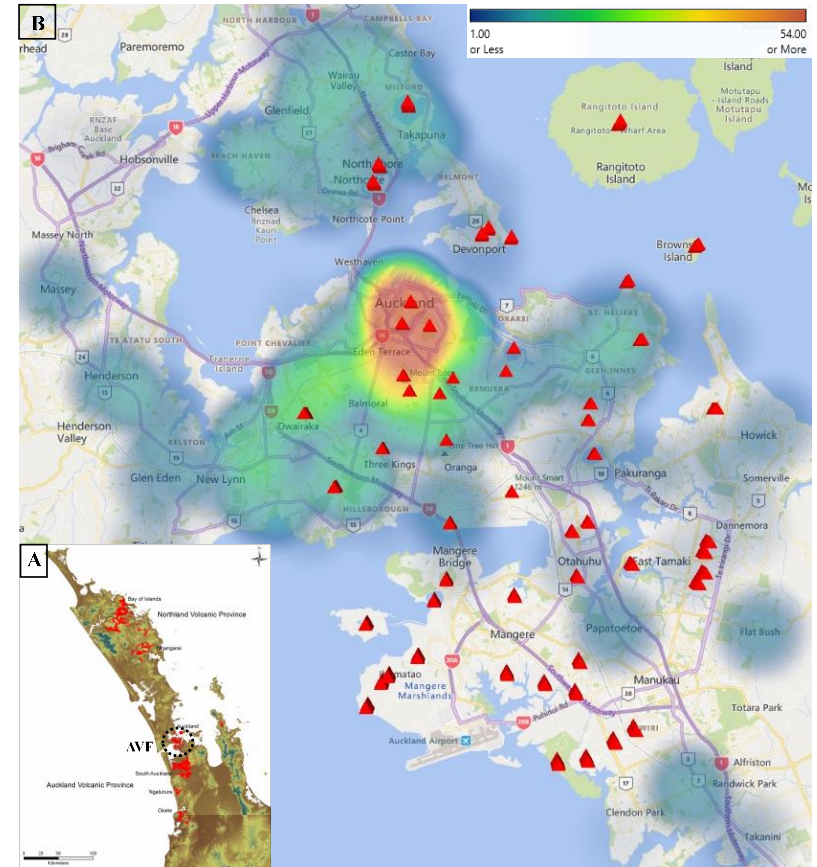
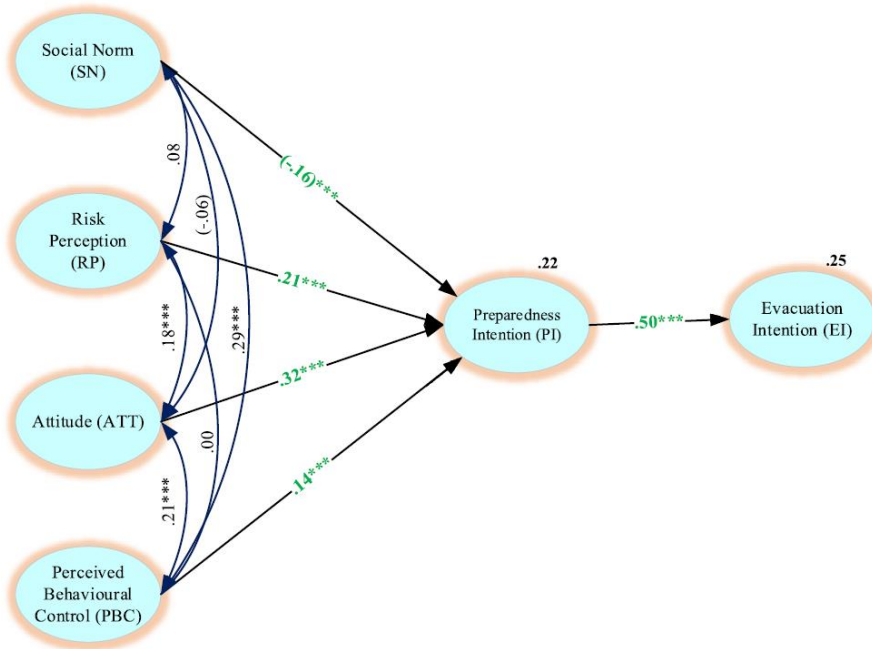
Auckland Evacuation

PhD Student: Mujaddad Afzal
Supervisors: Ranjitkar and Costello



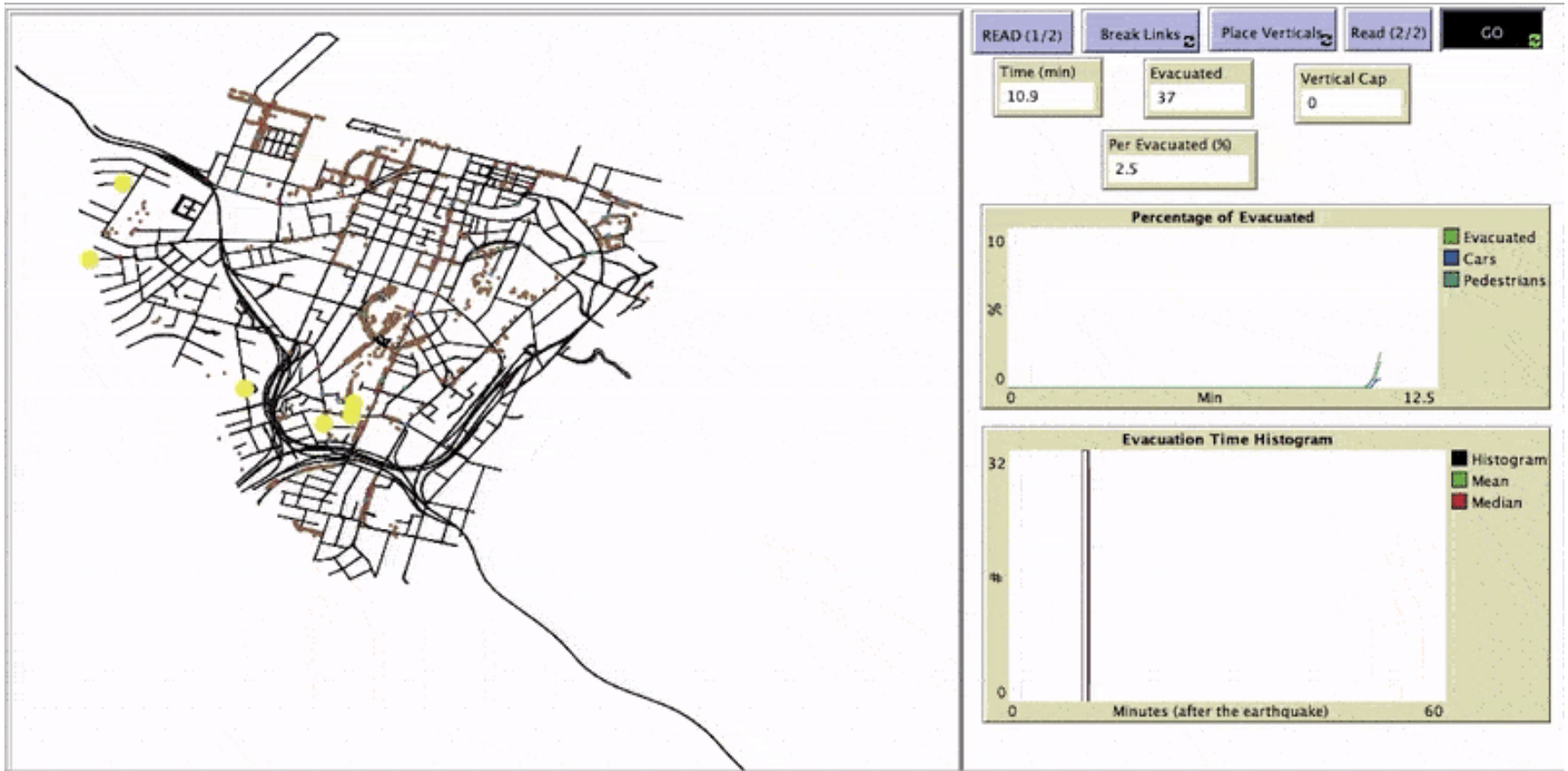
Evacuation Behaviour

PhD Student: Snehalata Thakur
Supervisors: Ranjitkar and Rashidi



Agent Based Evacuation Model

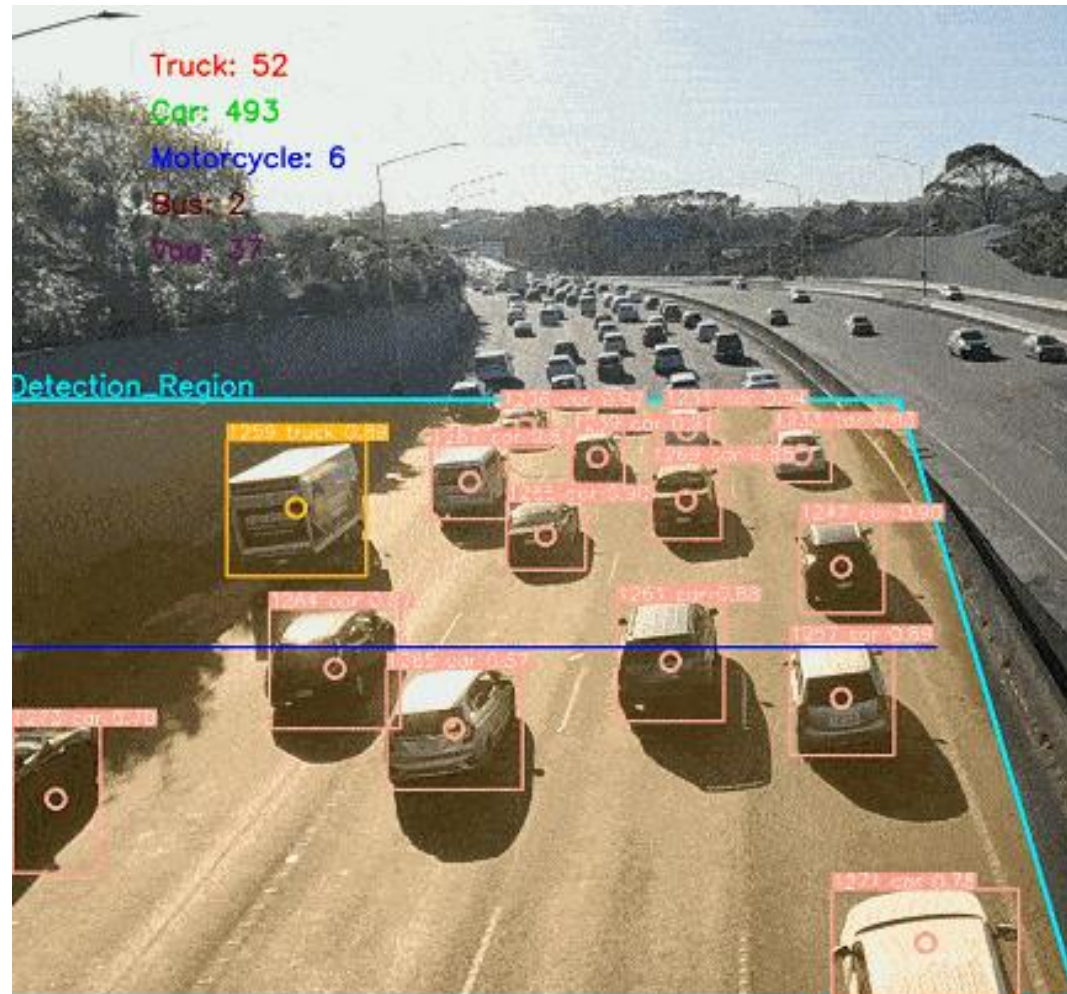
PhD Student: Gayani Senanake
Supervisors: Kieu, Dirks and Zou



Computer-vision-based traffic monitoring system

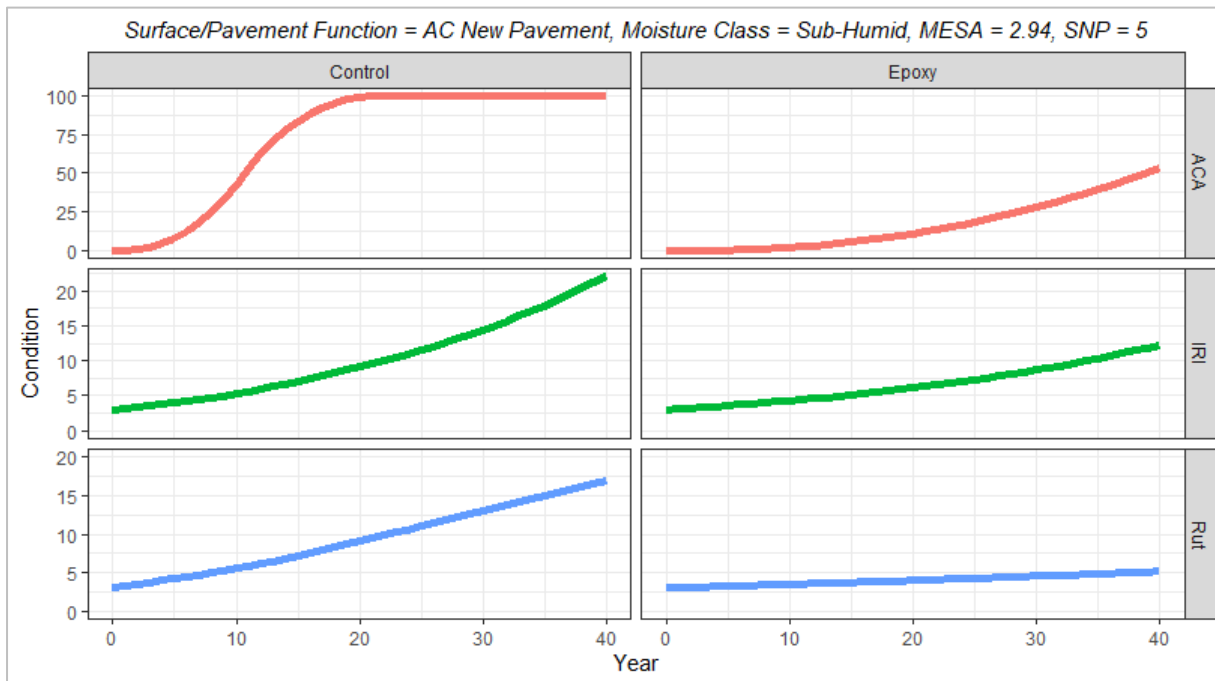
Student: TBD

Supervisor: Kieu



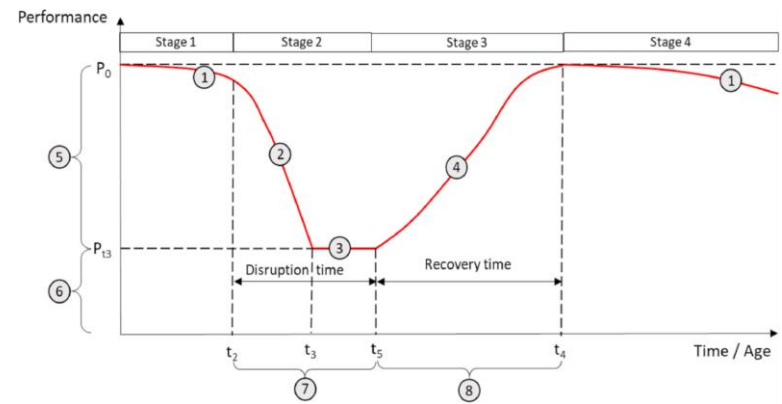
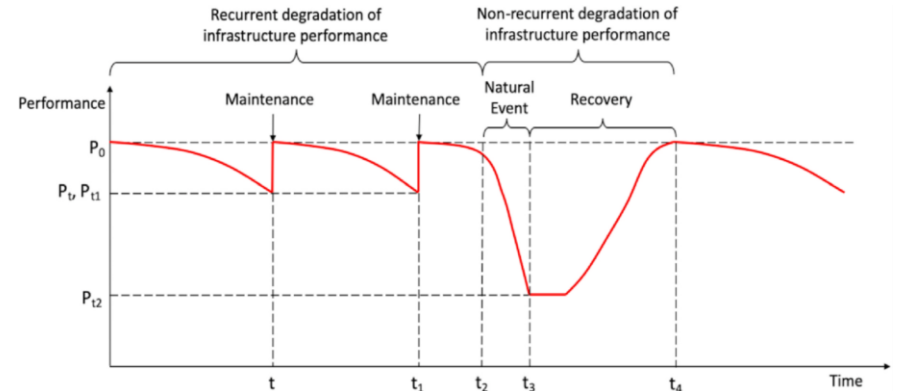
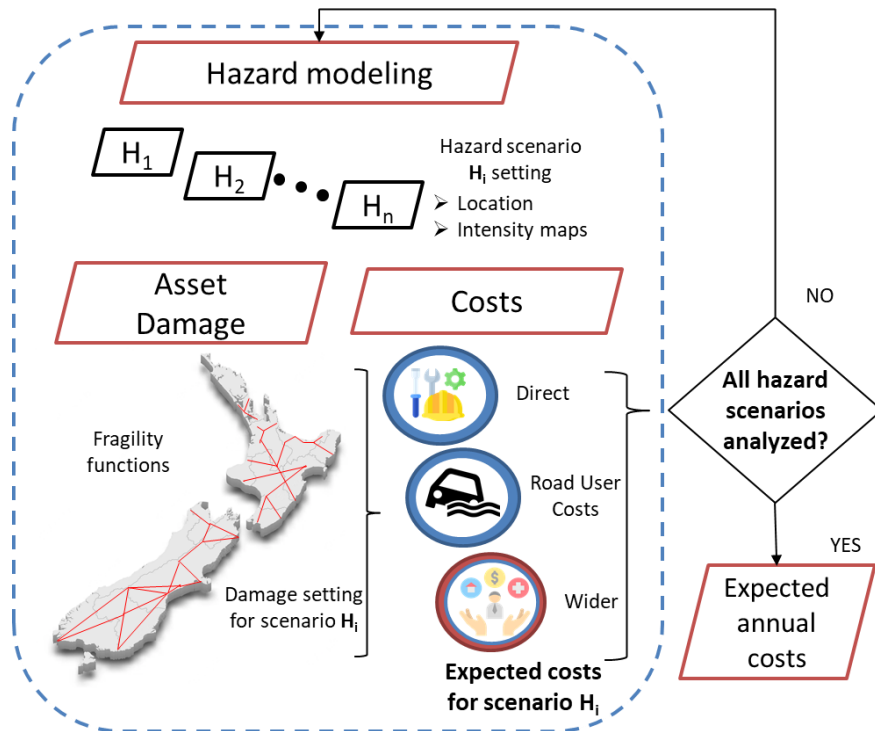
Climate resilient sustainable road pavement surfacings

PhD Student: Gemma Mathieson
Supervisors: Henning and Costello



Integrating TAM and Transport Resilience Decision-making

PhD Student: Eduardo Allen
Supervisors: Costello and Henning



Source: Cartes, P., Echaveguren Navarro, T., Chamorro Giné, A., Allen Binet, E. (2001). A cost-benefit approach to recover the performance of roads affected by natural disasters. International Journal of Disaster Risk Reduction, 53.

Future Research



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Integrated Transport Model



Agent Based Model for
New Zealand Transport
System

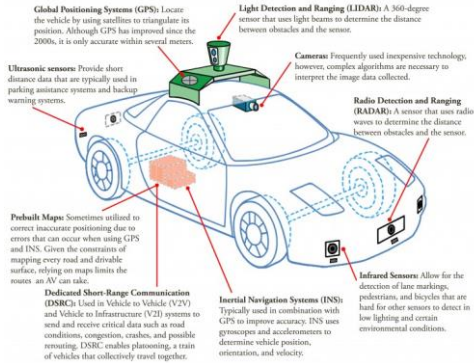
Project Monty



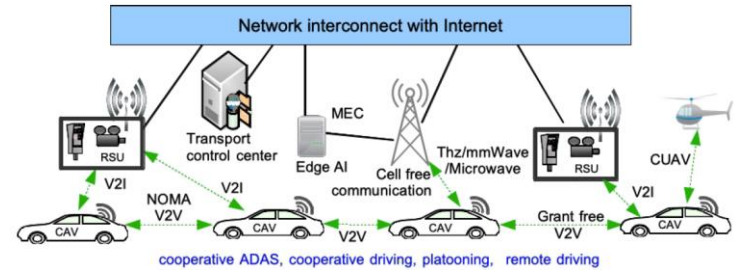
https://terourou.org/symposium/speakers/julie_mugford.pdf

<https://www.titanmodel.org/agent-based-modeling/>

Disruptive Technologies

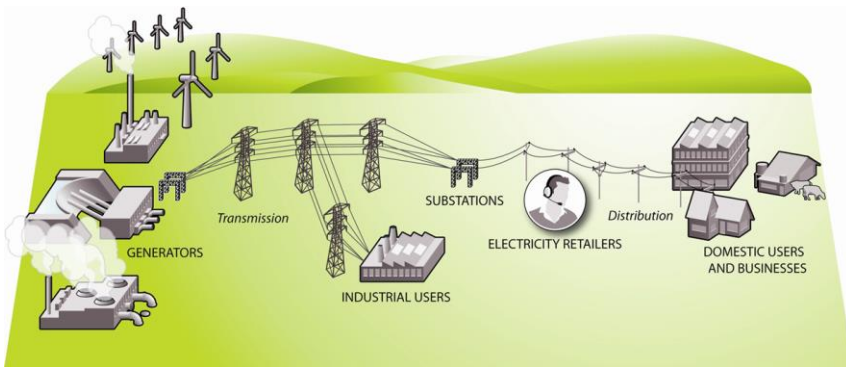


<https://www.pluglesspower.com/learn/wireless-ev-charging-works-tesla-model-s/>



MEC: mobile edge computing; RSU: roadside unit; CUAV: connected unmanned aerial vehicle
 CAV: connected and autonomous vehicles; V2V: vehicle to vehicle; V2I: vehicle to infrastructure

http://repository.essex.ac.uk/29078/1/in2020_cmr.pdf



<https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-generation-and-markets/electricity-market/electricity-industry/>



<https://www.powerselectronicsnews.com/wireless-charging-technology-for-evs/>

Thank You