Liam Pledger, Ph.D., B.E

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Liam Pledger
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Education

2025 - Present — **Post-doctoral research., ETH Zürich** Structural Earthquake Engineering.
Project: *Large-scale cyclic testing of squat T-shaped RC walls.*

2022 - 2025 — **Ph.D., University of Canterbury.** Structural Earthquake Engineering.
Thesis title: *The Effects of Reducing Design Drift Limits for Structures.*

2018 – 2021 — **B.E(Hons) 1st Class. Civil Engineering, UC.** Minor in Structural Engineering.
Honors research project: *3D Printed Concrete – Digital fabrication of artificial coral reefs through parametric design.*

Post-Doc Research

- Conducting large-scale bi-directional cyclic tests of squat T-shaped and L-shaped RC walls.
- Evaluating different modelling software to estimate the shear response and behaviour of squat walls subjected to bi-directional loading.
- Compiling data from more than 100 experiments of squat walls subjected to cyclic loading to estimate drift capacity, failure modes, and shear strength.

PhD Research

- Compiled field data from over 1600 buildings surveyed across 15 past earthquakes to quantify trends between damage and structural indices. Organized reconnaissance data following the 2023 Turkey-Syria.
- Designed and constructed a 2–storey "shake-table" capable of simulating floor motions.
- Completed 300+ dynamic tests of plasterboard walls and suspended ceilings using floor motions representative of structures designed to different drift limits.
- Designed and modelled 16 RC frames and 16 RC wall structures for different drift limits according to New Zealand standards. Conducted hazard-consistent incremental dynamic analyses for said structures. Quantified their performance in terms of collapse probability, seismic loss (PACT), and up-front cost.
- Developed open-source machine learning models to estimate the drift capacity of RC sections. Walls & Columns

Skills

Coding — Python, Machine Learning, MATLAB, HTML, LaTeX
Software — OpenSeesPy, STERA3D, SAP2000, AutoCAD, MathCAD
Lab work — Calibration and instrumentation of accelerometers, LVDTs, Temposonics, and OptiTrack. Use of MTS TestSuite and high-speed dynamic actuators.
Misc. — Academic research, teaching, tutoring, LaTeX typesetting and publishing.

Awards and Experience

Awards and Achievements

2021 **Park and Paulay Prize**, Department prize for excellence in Earthquake Engineering.

2022 **Concrete Prize**, Department prize for outstanding ability in the design and use of concrete.

Experience

2023 **E-Defense, Kobe Japan**. Assisted with the instrumentation and structural health monitoring of the 10-storey BRBF structure tested at E-Defense.

2024 **ATC-15-17 Workshop – San Diego, US**. Presented at the 18th U.S.-Japan-New Zealand Workshop on the Improvement of Structural Engineering and Resilience. Presentation Title : *Designing to lower drift limits: the impacts on construction costs and non-structural components.*

Employment History

2021 – 2025 **Teaching Assistant.** Civil Engineering Department, University of Canterbury. Courses: ENCI436, ENCI438, ENCI335, ENCN242, ENCI213, EMTH210

2020 – 2021 **Summer Intern,** Silvester Clark Consulting Engineers Ltd.

Research Publications

Thesis

1. **L. Pledger**, "The effects of reducing design drift limits for structures," Ph.D. dissertation, University of Canterbury, 2025. DOI: 10.26021/16276.

Journal Articles

1. E. Chacón-Valero, S. Pujol, M. Hube, **L. Pledger**, and C. Kerby, "Displacement history effects on the drift capacity of reinforced concrete structural walls," *Earthquake Spectra*, vol. 41, no. 5, pp. 3805–3825, 2025. DOI: 10.1177/87552930251377733.
2. F. B. Koroglu, M. F. Gullu, S. Ciftci, **L. Pledger**, C. Schill, and S. Pujol, "A fast seismic assessment technique for reinforced concrete buildings: ML-based Hassan Index," *Structures*, vol. 82, p. 110 425, 2025. DOI: 10.1016/j.istruc.2025.110425.
3. **L. Pledger**, S. Pujol, and R. Chandramohan, "Estimating the drift capacity of RC columns using machine learning," *ACI Structural Journal*, vol. 123, no. 2, 2025. DOI: 10.14359/51749374.
4. **L. Pledger**, S. Pujol, and R. Chandramohan, "Estimating the dynamic properties of wall-frame structures," *Bulletin of the New Zealand Society for Earthquake Engineering*, vol. 59, no. 1, pp. 39–50, 2025.
5. **L. Pledger**, S. Sistla, S. Pujol, and R. Chandramohan, "A comparison of ground motion intensity measures for estimating collapse," *Earthquake Spectra - (under review)*, 2025.
6. S. Pujol, I. Bedirhanoglu, **L. Pledger**, *et al.*, "Quantitative evaluation of the damage to RC buildings caused by the 2023 southeast Turkey earthquake sequence," *Earthquake Spectra*, vol. 40, no. 1, pp. 505–530, 2024. DOI: 10.1177/87552930231211208.

Conference Proceedings

1. **L. Pledger**, S. Pujol, and R. Calcagno, "Designing to lower drift limits: The impacts on construction costs and non-structural components.," in *ATC-15-17 : 18th U.S.-Japan-New Zealand Workshop on the Improvement of Structural Engineering and Resilience*, San Diego, USA, Dec. 2024.

2 **L. Pledger**, S. Pujol, and R. Chandramohan, "Reducing design drift limits," in *In Proceedings: 18th World Conference on Earthquake Engineering*, Milan, Italy, Jul. 2024.

3 **L. Pledger**, S. Pujol, and R. Chandramohan, "Investigating the effect of stiffness on the seismic performance of RC structures," in *In Proceedings of the 2023 NZSEE Annual Conference*, Auckland, New Zealand, Apr. 2023. URL: http://13.237.132.70/handle/nzsee/2570.