

# Robbie van Leeuwen

STRUCTURAL ENGINEER

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## Education

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### Delft University of Technology

Delft, The Netherlands

MASTERS OF STRUCTURAL ENGINEERING (STRUCTURAL MECHANICS) *cum laude*

Sep. 2016 - Jun. 2018

- Placed first in the following courses: Timber and Timber Structures 1, Steel Structures 2, Probabilistic Design, Plastic Analysis, Structural Dynamics, Stability of Structures, Prestressed Concrete, Computational Modelling of Structures.
- Graduation Thesis titled 'A Multiphysics Numerical Framework for Epoxy Resins' awarded a 9/10.
- Overall Weighted Average: 9.1/10.
- Delft University of Technology was ranked 4<sup>th</sup> in the QS World University Rankings for Civil/Structural Engineering in 2018.

### The University of Sydney

Sydney, Australia

BACHELOR OF CIVIL ENGINEERING (STRUCTURES) (HONS. I)

Mar. 2009 - Nov. 2012

- High distinction average. Honours thesis investigated the crosswind loading and vortex shedding of a building with a unique profile, inspired by the tubercles on a humpback whale's fin.

## Experience

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### Partridge Structural

Sydney, Australia

DESIGN ENGINEER

Dec. 2011 - Jul. 2016

- Partridge is a medium sized consulting firm that practices in a range of disciplines and specialises in high-end residential projects. In my role as design engineer I was responsible for the detailed structural design and documentation of a variety of building projects including residential, multi-residential, event, commercial and public works.
- The following list of projects gives an indication of the structural analysis and design that I have carried out during my time at Partridge.

#### Unconventional Structures:

- *SkyMate I*: Design of a 26 metre high steel cable structure for use as an aerial adventure park. A 3D frame model was used to validate the redundancy of the cable structure and the impact of varying cable sag. A non-linear finite element analysis was performed for a critical structural connection to determine its plastic capacity. This project was the joint winner of the Association of Consulting Structural Engineers NSW: Special/Unusual Projects category in 2016.
- *SkyMate II*: An evolution of SkyMate I incorporating similar design aspects to suit a narrow and difficult site. A new lateral stability system was devised to suit the new design. A 30 m long zip line with a cantilevered exit tower was integrated into the structure.
- *Samsung Spiral Stairs*: Design of a 14 metre steel plate spiral staircase for an office fit-out. A harmonic analysis was conducted to verify that the human-induced vibration of the stairs was within acceptable limits.
- *Woodford Cable Net*: Analysis of a 20 metre triangular grid of steel cables that formed a netted shade structure over a performance space. A construction sequence analysis of the cable net was performed to determine the optimal drape of the cables.
- *Sydney Wild Life Zoo – Wild Flight*: Design of a 60 m long aerial ride, suspended by a complex array of cables from an existing arched roof structure. The existing roof spanned 40 metres with a shallow arch profile and had limited reserve capacity. A non-linear analysis was performed to confirm its adequacy and necessary strengthening measures were designed and incorporated into the new structure.

#### Residential Structures:

- *105 Ramsgate Avenue*: Analysis of a five-storey residential concrete framed building with multiple transfer levels, featuring slender columns below the lower transfer level. A VBA program was developed to ensure concrete filled steel columns had sufficient strength and stability.
- *58 John Street*: Design and detailing of a three-storey residential building using mixed construction. Staged shoring was required to allow excavation into sand and rock adjacent to the neighbouring properties. A bespoke steel stair, with a structural plate balustrade was designed to be suspended from a perforated steel plate spine.
- *7 Wolseley Crescent*: Alterations and additions of an existing waterfront property that involved significant demolition and temporary propping. Two stories of concrete were supported on a grid of heavy steelwork with 7 metre long props as the two levels underneath were demolished and rebuilt. Extensive strengthening of the existing structure was required to achieve the new architectural brief.
- *15 Beaconsfield Road*: Design and detailing of a four-storey residential building with large cantilevered balconies and a concrete wall acting as a deep beam.

#### Multi-Residential Structures/Public Works:

- *Hudson Street*: Design of a six-storey concrete framed multi-residential building. Strut and tie analyses were used to confirm the adequacy of concrete walls acting as deep beam transfer elements.
- *Sydney Light Rail Extension*: Design of cantilevered steel awnings and associated platform infrastructure for the Inner West Light Rail Extension.

## The University of Sydney

Sydney, Australia

UNIVERSITY TUTOR

Jul. 2010 - Jun. 2011

- I was a tutor for the second year subject CIVL2201: Structural Mechanics, and the first year subject ENGG1061: Advanced Engineering.
- As a tutor for CIVL2201 I was required to deliver a two hour tutorial to thirty students each week, in which I reinforced the coursework delivered in the lectures and assisted with tutorial questions and assignments.
- As a tutor for ENGG1061 I mentored six advanced engineering students by helping them to deliver a creative solution to an engineering problem.

## The University of Sydney

Sydney, Australia

SUMMER RESEARCH SCHOLAR

Dec. 2010 - Mar. 2011

- I was awarded a scholarship to conduct research in a field of my choosing under the supervision of an academic in the School of Civil Engineering.
- In my research, titled 'Validation of the Cobra Probe', I devised a unique method for the calibration of the Cobra Probe anemometer.
- Following an extensive literature review I developed a LabVIEW calibration program, which facilitated the integration of the probe into the wind tunnel at the School of Civil Engineering.

## Skills

### Structural design

Finite element analysis of structures and structural connections, concrete detailing & design, steel detailing & design, timber detailing & design, glass detailing & design, composite detailing & design, cable detailing & design, foundations and retaining structures, strut and tie modelling.

### Engineering software

Strand7, SPACE GASS, RAPT, SLABS, Limcon, Microsoft Excel, AutoCAD, Rhinoceros & Grasshopper.

### Programming

Python, MATLAB, L<sup>A</sup>T<sub>E</sub>X, VBA, C++ & Javascript.

## Honours & Awards

2016	<b>Winner</b> , Association of Consulting Structural Engineers NSW: Special/Unusual Projects	Sydney, Australia
2012	<b>Prize</b> , JW Roderick Prize for the Best Thesis in Final Year Civil Engineering	Sydney, Australia
2012	<b>Prize</b> , AS MacDonald Prize of the Association of Consulting Structural Engineers of New South Wales in Structural Engineering	Sydney, Australia
2012	<b>Prize</b> , DG Walkom Prize for First Class Honours in Civil Engineering	Sydney, Australia
2011	<b>Prize</b> , University of Sydney Academic Merit Prize	Sydney, Australia
2010	<b>Prize</b> , University of Sydney Academic Merit Prize	Sydney, Australia
2010	<b>Prize</b> , Civil Engineering Graduates Prize for Structures I and Structural Design I	Sydney, Australia
2010	<b>Prize</b> , Civil Engineering Graduates of 1950 Prize in Soil Mechanics	Sydney, Australia
2009	<b>Scholarship</b> , University of Sydney Entry Scholarship	Sydney, Australia

## Other

### Arbitrary Cross-Section Analysis in Python

GitHub Repository

DEVELOPER

Sep. 2017 - Nov. 2017

- Developed a finite element program to perform a cross-section analysis on an arbitrary cross-section.
- All relevant cross-section properties are calculated and a stress analysis is implemented.

### Structural Engineering Blog

<https://robbievanleeuwen.github.io>

BLOGGER

Nov. 2015 - PRESENT

- Maintaining and updating a personal blog related to structural engineering and in particular, implementations of computational mechanics.

### U-Profiel Committee

U-BASE, TU Delft

CHAIRMAN

Sep. 2017 - Apr. 2018

- U-Profiel is the official magazine of the United Building and Structural Engineering Association (U-BASE).
- As the chairman I was responsible for the management of the committee and all communication with internal and external parties.

## Memberships

Current **Member of the Institute of Engineers Australia**, [MIEAust]

Current **Student Member of The Institute of Structural Engineers**, [StudStructE]