Seven PhD scholarships in Structural Engineering at the **Steel and Composite Structures** group at the University of Melbourne

Description

We are looking for **seven** PhD students to work on the following projects (see the group website https://infrastructure.eng.unimelb.edu.au/scs for more information).

1. Seismic performance and earthquake design of composite modular buildings

This project will explore the performance of the composite systems (i.e., composite modular unit and inter-module connection) that we are currently developing for modular tall building. The project will involve both experimental testing (shaking table test) and numerical modelling (ABAQUS) for the whole modular buildings to ensure our newly developed structural systems can meet the requirements for earthquake actions. We have available testing and modelling facilities at Melbourne to carry out this project.

2. Fire performance of inter-module connections of composite modular buildings

This project will look at the fire performance of the new joining technique that we have developed for modular tall buildings to ensure its fire safety for practical applications. Both novel experimental testing (using the H-TRIS fire testing method) and advanced numerical simulation (using coupled fire-thermo-mechanical analysis with FDS and SAFIR software) will be employed to make sure the fire safety of our newly developed joining method under any real fire scenarios.

3. Fire induced progressive collapse of composite modular buildings

This project will examine the structural robustness of composite modular buildings against progressive collapse triggered by fire. The project will focus on advanced modelling techniques (using SAFIR software) for the complex behaviour of inter-module joints of composite modular buildings.

4. Fire performance of high strength CFST columns

The use of high strength materials in CFST columns not only reduces column sizes and consequently generates more valuable workspace for commercial use, but also provides sustainability benefits by reducing the use of construction materials. This project will explore the fire performance of high strength CFST columns that our group has developed recently. The project will involve both experimental testing and numerical modelling of high strength CFST columns under real fire scenarios.

5. Fire performance of high strength concrete

High strength concrete has been increasingly used in construction of columns in high rise buildings, towers in bridges and primary load-bearing members in large infrastructure. Recently, our group has developed a cost-effective mix design for high strength concrete (with compressive strength up to 170 MPa) using raw materials and normal curing method. Therefore, this project will examine the fire performance of such high strength concrete to promote its practical application in construction of concrete and composite structures.

6. Physics informed machine learning for structural engineering applications

By integrating data and mathematical physics models, physics informed machine learning can give results quickly with high accuracy. This project will develop a new physics informed machine learning framework for structural engineering application. The project will be co-supervised by experts in machine learning from the School of Computing and Information Systems in the Faculty of Engineering and IT.

7. A coupled CFD and FE computational framework for steel and composite buildings

This project will develop a computational tool for predicting the structural responses of steel and composite buildings under fires which is of critical importance in assessing the building safety. By combining computational fluid dynamics (CFD) and finite element (FE) techniques in a coupled fire-thermo-mechanical analysis, the newly developed tool can capture three main physical aspects of structures under realistic fires (i.e., fire development, thermal behaviour, and structural response). Since the CFD tool is capable of simulating user-defined fires, the proposed tool can simulate both standard and real fire scenarios such as natural fires, localised fires, travelling fires, etc.

Eligibility criteria

You should (1) hold a Bachelor (first class honours) or Master degree in Civil or Structural Engineering with a Weighted Average Mark (WAM) over **80/100**; and (2) meet the English requirements with overall **IELTS 6.5** with no band below 6.0.

Stipend

Each scholarship is valued at **AUD32,400/annum** for up to 3.5 years with tuition fee waived up to 4 years. Additional packages include 3000$ relocation and health insurance (about 4000$). More info https://scholarships.unimelb.edu.au/awards/graduate-research-scholarships

Open date

Applications are now open.

Close date

Applications close when the positions have been filled.

How to apply

Please email your CV and academic transcript to Dr Tai Thai (tai.thai@unimelb.edu.au). Please accept his apology if you have not received his response because he might be able to response to short-listed candidates only due to the large number of emails received. Thank you very much for your interest and much appreciated your understanding.

Supervisor detail

Dr Tai Thai
ARC Future Fellow and Associate Professor of Structural Engineering
Leader of the Steel & Composite Structures group (https://infrastructure.eng.unimelb.edu.au/scs/people)
Personal websites

- University of Melbourne: https://findanexpert.unimelb.edu.au/profile/827153-tai-thai
- Google Scholar: https://scholar.google.com.au/citations?user=6x96L_YAAAAJ&hl=en
- Scopus: https://www.scopus.com/authid/detail.uri?authorId=24765493900
- ORCID: https://orcid.org/0000-0002-4461-9548
- Web of Science: https://publons.com/researcher/V-4020-2019
- ResearchGate: https://www.researchgate.net/profile/Tai_Thai