

# James Christopher Koch

M.Sc

DE (+49) 0151 4719 7086 | ✉jchkoch@gmail.com | 🏠jckoch.gitlab.io | 📺jckoch | 📷jckoch

## Education

09/2018 - 06/2020

### Master of Structural Engineering & Building Technology

Chalmers University of Technology; Göteborg, Sweden

Courses in timber, concrete, and steel design as well as structural design and finite element analysis. Thesis supervised by [Dr. Robert Jockwer](#) on brittle failure modes of dowel-type timber connections.

MSc Thesis:

The growing popularity of timber as a building material fuelled by a increasing rise of both environmental and social sustainability is pushing timber structures to new heights. Taller and more complex timber structures are leading to higher capacity connections being required to continuing ensuring safe, efficient, robust, and reliable timber structural designs. Connections play an important role in the overall safety and reliability of timber structures by introducing ductility into the structural system to counteract the inherent brittle material behaviour of wood. Steel-timber connections are a common practical connection choice for high capacity connection systems to maintain ductility requirements as structures increase in height. To allow for a higher capacities, these connections are increasing not only the size of the timber members being joined together but also increasing the size and number of fasteners. Both of these two effects increase the likelihood of brittle failure mechanisms to occur; however, the likelihood of brittle failure modes is still a complex function of both material and geometric properties. The aim of this master's thesis is to develop a better understanding of when brittle failure mechanisms in high capacity timber connections occur to assist in the inclusion of explicit brittle failure models in reliable and robust timber connection design methods in tall timber structures. Simulation of material and geometric parameters of timber connections are presented to qualitatively assess the impact on capacity of the connection and the likelihood of brittle failure.

09/2013 - 04/2018

### Bachelor of Civil & Environmental Engineering

University of Alberta; Edmonton, AB, Canada

Graduated with distinction. Grade Point Average: 3.6/4.0

Involved as a member of the Steel Squad which is part of the Steel Centre at the University of Alberta.

Mentored by [Patrick Geers](#) during my structural engineering capstone project course.

## Research Experience

05/2018 - 08/2018

### Research Assistant - Structural Engineering

University of Alberta; Edmonton, Canada

Undergraduate Student Research Award; National Science & Engineering Research Council

The aim of this research was to investigate the lateral torsional buckling behaviour of singly-symmetric steel girders more generally. It included both analytical and numerical computation of the bending moment capacity of over 16000 differently sized girders using Python.

Project: Investigate Lateral-Torsional Buckling Behaviour of Singly-symmetric Steel Girders

09/2017 - 04/2018

### Research Assistant - Structural Engineering

University of Alberta; Edmonton, Canada

Dean's Research Award

Done concurrently with a semester of my bachelor's studies. Consisted of evaluating the asymmetry parameter for singly-symmetric beams with respect to definitions according to the Canadian design standard and it's analytical definition.

Project: Evaluation of CSA S16-14 Asymmetry Parameter for Singly-symmetric Beams

01/2017 - 08/2017

### Research Assistant - Transportation Engineering

University of Alberta; Edmonton, Canada

My job duties included assisting in ongoing research on using Light Detection and Ranging (LIDAR) data in the field of transportation engineering. The research efforts focus on computer vision to extract useful features within LIDAR data for transportation safety analysis. My tasks included working and processing large amounts of data efficiently by programming automated data extraction, cloud computing, and assisting graduate students.

## Professional Experience

|                   |  |
|-------------------|--|
| 08/2020 - current | <b>Structural Engineer</b><br>Fast+Epp GmbH; Darmstadt, Germany  |
| 05/2016 - 08/2016 | <b>Engineering Intern</b><br>Wayss & Freytag Ingenieurbau AG; Frankfurt am Main, Germany<br>My job duties included assisting members of the engineering team by helping to perform technical calculations and computation within tunneling projects. These tasks included performing statics analysis of retaining walls used in the construction of tunnels in the "cut and cover" method as well as assisting in the structural design of temporary bridges to support pipelines during construction of tunnels using this method. Further tasks included analyzing ground settlement and grain sizes. |
| 05/2015 - 12/2015 | <b>Surveyor</b><br>IBI Group; Edmonton, Canada<br>My responsibilities included surveying for land development with GPS survey equipment as well as rod & level survey equipment. Further responsibilities included communicating with contractors on-site as well as gathering together as-built survey data for cost estimating use.  |

## Skills

|                       |  |
|-----------------------|--|
| Structural design     | timber detailing & design, foundations and retaining structures, steel detailing and design, concrete detailing & design |
| Research              | lateral torsional buckling, timber connections   |
| Computer science      | machine learning, iterative algorithms, computer vision  |
| Programming           | Python, MATLAB, L <sup>A</sup> T <sub>E</sub> X, R, Linux, Autodesk Revit  |
| Transportation design | accident analysis, sight distance analysis, asset management, LIDAR data analysis  |
| Construction          | surveying, collaborative project planning  |
| Engineering software  | Microsoft Excel, AutoCAD, SAFE, SAP2000, Abaqus, Plaxis, Comsol  |

## Languages

|         |                                 |
|---------|---------------------------------|
| English | native or bilingual proficiency |
| German  | native or bilingual proficiency |
| Swedish | elementary proficiency          |

## Awards & Honors

|                  |   |
|------------------|---|
| 05/2018          | Undergraduate Student Research Award, National Science and Engineering Research Council; Edmonton, Canada |
| 04/2018          | Dean's Research Award, University of Alberta; Edmonton, Canada  |
| 09/2016, 09/2017 | Jason Lang Scholarship, University of Alberta; Edmonton, Canada   |
| 09/2013          | Academic Excellence Scholarship, University of Alberta; Edmonton, Canada                                  |
| 09/2013          | Academic Excellence Award, University of Alberta; Edmonton, Canada  |
| 06/2013          | National Scholar (Canada), Advanced Placement (AP); Edmonton, Canada                                      |
| 04/2013          | German Sprachdiplom C1; Kulterministerkonferenz, Germany  |

## Organizations

|                   |   |
|-------------------|---|
| 06/2018 - 11/2020 | <b>Engineer-In-Training</b><br>Association of Professional Engineers and Geoscientists of Alberta; Canada |
|-------------------|---|

## Volunteer Experience

- 09/2017 - 04/2018 | **Engineering Coop Student Mentor & Ambassador Lead**  
University of Alberta; Edmonton, Canada  
My role was as a mentor within the Mentorship Initiative of the Engineering Co-op Student Ambassador Program at the University of Alberta.
- 11/2017 - 04/2018 | **Workshop Assistent**  
The Carpentries; Edmonton, Canada  
My role was a helper in a workshop designed to teach effective software development skills and data management practices at a university research level. The workshop was primarily intended for graduate students.

## Interests

| cross-country skiing, downhill skiing, trumpet playing, running, hiking