

Joshua Chen

CURRICULUM VITAE

✉ mail@joshchen.io ☎ +49 1578 080 5263

🌐 joshchen.io 🐙 [jaycech3n](https://github.com/jaycech3n) in [joshuacws](https://www.linkedin.com/in/joshuacws)

I'm a soon-to-be Masters graduate in mathematics. My work is in mathematical logic and automated proof, as well as machine learning, text mining, and natural language processing. Previously, I studied category theory and quantum algebra.

EDUCATION

Masters in Mathematics
(in grading)

University of Bonn
2015–2018

Advisor: Prof. Dr. Peter Koepke

B.Sc. (Honours) Mathematics
with First Class Honours

The Australian National University
2013–2014

Advisor: Assoc. Prof. Scott Morrison

B.Sc. Mathematics
Dean's Congratulations

University of Canterbury
2010–2012

RESEARCH & WORK

Homotopy type theory in Isabelle/Pure
Masters thesis project

University of Bonn
2017–present

Masters thesis project in type theory and automated proof. I implemented a homotopy type theory object logic for the interactive proof assistant Isabelle. The implementation is capable of formalizing large portions of standard presentations of homotopy type theory. I continue to actively develop the code at <https://github.com/jaycech3n/Isabelle-HoTT>.

Targeted topic modeling for the E2mC emergency response system
Research assistant

Fraunhofer IAIS
2017–2018

I worked in the Knowledge Discovery group of the Fraunhofer Institute for Intelligent Analysis and Information Systems, applying probabilistic models to analyze and classify topics in tweet corpora. I implemented targeted topic models in Java and also used Python for natural language processing of Twitter data. This work was part of the European Union's E2mC project, a pilot project aiming to use social media data to enhance the EU's emergency management and response system.

Visualization and enumeration of planar trivalent graphs
Research assistant

Australian National University
2015

I developed and implemented algorithms in Scala to enumerate and automatically draw certain classes of planar graphs. This was part of research in quantum algebra investigating subfactors and planar algebras. My code was incorporated into the repository at <https://bitbucket.org/scottmorrison/toolkit/>.

The Temperley-Lieb categories and skein modules
Honours thesis

Australian National University
2013–2014

Final year Bachelors research thesis in category theory, quantum algebra, and an application to low-dimensional topological invariants. Available online at [arXiv:1502.06845](https://arxiv.org/abs/1502.06845) [math.QA].

Integer houses in cyclotomic fields
Summer research program

Australian National University
Nov 2012–Jan 2013

International undergraduate research program, where I investigated questions concerning the dimensions of objects in fusion categories with the aid of Wolfram Mathematica.

AWARDS & ACHIEVEMENTS

ANU Mathematical Sciences Institute Honours Scholarship	2013
ANU Summer Research Scholarship	2012
University of Canterbury Peter Bryant Prize for pure mathematics	2011

TEACHING ASSISTANCE

Intelligent Learning and Analysis Systems: Machine Learning
(MA-INF 4111)

University of Bonn, Winter 2017/18

Intelligent Learning and Analysis Systems: Data Mining and Knowledge Discovery
(MA-INF 4112)

University of Bonn, Summer 2017

Engineering Mathematics 1B
(EMTH119)

University of Canterbury, Fall 2015

Mathematics and Applications 1
(MATH103)

University of Canterbury, Fall 2014

Discrete Mathematics
(MATH120)

University of Canterbury, Fall 2013

TECHNICAL SKILLS & EXPERIENCE

Programming languages	Python, Java, Scala, Standard ML, C++, SQL, Wolfram Mathematica
Python packages	pandas, spaCy, NLTK, Jupyter, Matplotlib, NumPy, Tweepy, Psycopg2, ...
Software & tools	Git, LaTeX, Isabelle, HTML/CSS, Javascript