Joshua Chen

✉ josh@joshchen.io 📱 +43 660 77 20 855

🌐 joshchen.io ⧉ jaycech3n in joshuacws

I'm a first-year Ph.D. student in the Computational Logic group of the University of Innsbruck, currently working on both practical and foundational aspects of interactive proof systems. My background is in pure mathematics with some experience in machine learning and natural language processing.

Education

Ph.D. Computer Science	University of Innsbruck
Advisor: Assoc. Prof. Cezary Kaliszyk	2019–present
Masters in Mathematics	University of Bonn
German GPA 1.9	2015–2018
Advisor: Prof. Dr. Peter Koepke	
B.Sc. (Honours) Mathematics	The Australian National University
First Class Honours, GPA 80% (Scale: 0–100%)	2013–2014
Advisor: Assoc. Prof. Scott Morrison	
B.Sc. Mathematics	University of Canterbury
Dean's Congratulations, GPA 8.64 (Scale: 0–9)	2010–2012

Research & Work

Homotopy type theory in Isabelle/Pure   University of Bonn
Masters thesis   2017–2018

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

Targeted topic modeling for the E2mC emergency response system   Fraunhofer IAIS
Research assistant   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   Australian National University
Research assistant   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   Australian National University
Honours research thesis   2013–2014

    Final year Honours research thesis in category theory, quantum algebra, and applications to low-dimensional topological invariants. Available online at `arXiv:1502.06845`[math.QA].

Integer houses in cyclotomic fields   Australian National University
Summer research program   Nov 2012–Jan 2013

    Eight-week selective international undergraduate research program. I investigated questions concerning the dimensions of objects in fusion categories with the aid of Wolfram Mathematica.

TEACHING ASSISTANCE

Machine Learning   University of Bonn
MA-INF 4111   Winter 2017/18

Data Mining and Knowledge Discovery   University of Bonn
MA-INF 4112   Summer 2017

Engineering Mathematics 1B   University of Canterbury
EMTH119   Fall 2015

Mathematics and Applications 1   University of Canterbury
MATH103   Fall 2014

Discrete Mathematics   University of Canterbury
MATH120   Fall 2013

ACTIVITIES, ACHIEVEMENTS & AWARDS

Conference speaker   Australian Mathematical Sciences Student Conference
An Introduction to Topological Quantum Field Theory   2014

Mathematical Sciences Institute Honours Scholarship   Australian National University
                                                                               2013

Summer Research Scholarhip   Australian National University
                                                                               2012

Peter Bryant Prize for pure mathematics   University of Canterbury
                                                                               2011