

# Wenda Li

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## Education

- Ph.D. in Computer Science, University of Cambridge, 2019
  - Thesis: *Towards Justifying Computer Algebra Algorithms in Isabelle/HOL*
  - Advisor: Lawrence C. Paulson, FRS, ACM Fellow
- M.Phil. with Distinction in Advanced Computer Science, University of Cambridge, 2013
- B.S. in Computer Science, University of Nottingham, 2012
  - Class ranking: 1/150

## Research Interest

- machine learning for theorem proving,
- interactive theorem proving,
- verified symbolic computing,
- and mechanised mathematics.

## Work Experience

- Research associate on the ERC project [Alexandria](#) led by Lawrence C. Paulson, 2017 - present.
- Research internship, Centre for Plant Integrative Biology, University of Nottingham, Summer 2012. Work supervised by Tony P. Pridmore.

## Awards and Honors

- Highly Commended Award in the CPHC/BCS Distinguished Dissertation Competition, 2019.
- Springer Travel Award, 2016.
- Highest GPA Award, 2012.
- BP Achievement Award, 2010.
- The Best Student of the Year 09-10, 2010.
- Provost's Scholarship, 2010.

## Full Publications

\*: student I (co-)supervise.

### *Journal and Conference Publications*

- Albert Q. Jiang\*, Sean Welleck, Jin Peng Zhou, **Wenda Li**, Jiacheng Liu, Mateja Jamnik, Timothée Lacroix, Yuhuai Wu, Guillaume Lample. [Draft, Sketch, and Prove: Guiding Formal Theorem Provers with Informal Proofs](#). Accepted for the 11th International Conference on Learning Representations (ICLR), 2023. (Oral presentation, top-5%)
- Yuhuai Wu, Albert Q. Jiang\*, **Wenda Li**, Markus N. Rabe, Charles Staats, Mateja Jamnik, Christian Szegedy. [Autoformalization with Large Language Models](#). Neural Information Processing Systems (NeurIPS), 2022.
- Albert Q. Jiang\*, **Wenda Li**, Szymon Tworkowski, Konrad Czechowski, Tomasz Odrzygóźdź, Piotr Miłoś, Yuhuai Wu, Mateja Jamnik. [Thor: Wielding Hammers to Integrate Language Models and Automated Theorem Provers](#). Neural Information Processing Systems (NeurIPS), 2022.
- Anthony Bordg, Lawrence C. Paulson, **Wenda Li**. [Simple Type Theory is not too Simple: Grothendieck's Schemes in the Proof Assistant Isabelle](#). *Journal of Experimental Mathematics*, 2022.
- Angeliki Koutsoukou-Argyraiki, **Wenda Li**, and Lawrence C. Paulson. [Irrationality and Transcendence Criteria for Infinite Series in Isabelle/HOL](#). *Journal of Experimental Mathematics*, 2021.
- Yuhuai Wu, Markus Norman Rabe, **Wenda Li**, Jimmy Ba, Roger Baker Grosse, and Christian Szegedy. [LIME: Learning Inductive Bias for Primitives of Mathematical Reasoning](#). Proceedings of the Thirty-eighth International Conference on Machine Learning (ICML), 2021.
- **Wenda Li**, Lei Yu, Yuhuai Wu and Lawrence C. Paulson. [IsarStep: a Benchmark for High-level Mathematical Reasoning](#). Proceedings of the 9th International Conference on Learning Representations (ICLR), 2021.
- **Wenda Li** and Lawrence Paulson. [Evaluating Winding Numbers and Counting Complex Roots through Cauchy Indices in Isabelle/HOL](#), *Journal of Automated Reasoning*, 2019.
- **Wenda Li** and Lawrence Paulson. [Counting Polynomial Roots in Isabelle/HOL: A formal Proof of the Budan-Fourier Theorem](#). Proceedings of the 8th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP), 2019.
- **Wenda Li**, Grant Passmore and Lawrence Paulson. [Deciding Univariate Polynomial Problems using Untrusted Certificates in Isabelle/HOL](#). *Journal of Automated Reasoning*, 2017.
- **Wenda Li** and Lawrence Paulson. [A Formal Proof of Cauchy's Residue Theorem](#). Proceedings of the 7th International Conference on Interactive Theorem Proving (ITP), 2016.
- **Wenda Li** and Lawrence Paulson. [A Modular, Efficient Formalisation of Real Algebraic Numbers](#) Proceedings of the 5th ACM SIGPLAN Conference on Certified Programs and Proofs (CPP), 2016.
- Leah R. Band, Darren M. Wells, John A. Fozard, Teodor Ghetiu, Andrew P. French, Michael P. Pound, Michael H. Wilson, Lei Yu, **Wenda Li**, Hussein I. Hijazi, Jaesung Oh, Simon P. Pearce, Miguel A. Perez-Amador, Jeonga Yun, Eric Kramer, Jose M. Alonso, Christophe Godin, Teva Vernoux, T. Charlie Hodgman, Tony P. Pridmore, Ranjan Swarup, John R. King and Malcolm J. Bennett. [Systems Analysis of Auxin Transport in the Arabidopsis Root Apex](#). *The Plant Cell*, 2014.

### Workshop Publications

- Yuhuai Wu, Albert Q. Jiang\*, **Wenda Li**, Markus N. Rabe, Charles Staats, Mateja Jamnik, Christian Szegedy. Autoformalization with Large Language Models. *Conference on Artificial Intelligence and Theorem Proving (AITP)*, 2022.
- Albert Q. Jiang\*, **Wenda Li**, Mateja Jamnik. Learning Plausible and Useful Conjectures. *Conference on Artificial Intelligence and Theorem Proving (AITP)*, 2022.
- Albert Q. Jiang\*, **Wenda Li**, Jesse M. Han and Yuhuai Wu. LISA: Language Models of ISAbelle Proofs. *Conference on Artificial Intelligence and Theorem Proving (AITP)*, 2021.

### Thesis

- **Wenda Li**. [Towards Justifying Computer Algebra Algorithms in Isabelle/HOL](#). University of Cambridge, 2019. [Received a Highly Commended Award in the CPHC/BCS Distinguished Dissertation Competition.](#)

### Peer-refereed Formal Proofs

- Fox Thomson\* and **Wenda Li**. [The Theorem of Three Circles](#). Archive of Formal Proofs, 2021.
- Anthony Bordg and Lawrence Paulson and **Wenda Li**. [Grothendieck's Schemes in Algebraic Geometry](#). Archive of Formal Proofs, 2021.
- Angeliki Koutsoukou-Argyraki and **Wenda Li**. [Irrationality Criteria for Series by Erdős and Straus](#). Archive of Formal Proofs, 2020.
- Angeliki Koutsoukou-Argyraki and **Wenda Li**. [The Transcendence of Certain Infinite Series](#) Archive of Formal Proofs. 2019.
- **Wenda Li**. [The Budan-Fourier Theorem and Counting Real Roots with Multiplicity](#), Archive of Formal Proofs, 2018.
- Angeliki Koutsoukou-Argyraki and **Wenda Li**. [Irrational Rapidly Convergent Series](#), Archive of Formal Proofs, 2018.
- **Wenda Li**. [Count the Number of Complex Roots](#), Archive of Formal Proofs, 2017.
- **Wenda Li**. [Evaluate Winding Numbers through Cauchy Indices](#), Archive of Formal Proofs, 2017.
- **Wenda Li**. [The Sturm-Tarski Theorem](#), Archive of Formal Proofs, 2014.
- **Wenda Li**. [The Königsberg Bridge Problem and the Friendship Theorem](#), Archive of Formal Proofs, 2013.

### Invited Talks

- Proving Mathematical Theorems using Neural Networks
  - Huawei Mathematical Theorem Proving Workshop, April, 2022.
  - DeepMind, February, 2022.
  - SRI International, February, 2022.

- [Reasoning with Nonlinear Formulas in Isabelle/HOL](#), Formal Methods in Mathematics / Lean Together 2020, Carnegie Mellon University, January 7, 2020.
- *Reliable computations in the Isabelle proof assistant*, John Hopcroft Center for Computer Science, Shanghai Jiao Tong University, December 19, 2018.
- [Evaluating Winding Numbers through Cauchy Indices in Isabelle/HOL](#), Big Proof, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, July 17, 2017.

## Teaching Experience

- Teaching Assistant, *Foundations of Computer Science*, University of Cambridge, Michaelmas 2016, Michaelmas 2018, and Michaelmas 2019.
- Teaching Assistant, *Algorithms*, University of Cambridge, Lent 2015.
- Teaching Assistant, *ML Practical Classes*, University of Cambridge, Michaelmas 2013-2017.

## Academic Service

### *Reviewers*

- Interactive Theorem Proving (ITP), 2021, 2022
- Certified Programs and Proofs (CPP), 2016, 2018 and 2021
- International Joint Conference on Automated Reasoning (IJCAR), 2020
- International Symposium on Symbolic and Algebraic Computation (ISSAC), 2016, 2019
- International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC), 2018
- Journal of Logical and Algebraic Methods in Programming, 2018-
- Journal of Automated Reasoning, 2017-

### *Program Committee*

- Conference on Intelligent Computer Mathematics (CICM), 2018

### *Workshop Organiser*

- [The Role of Mathematical Reasoning in General Artificial Intelligence](#), at ICLR 2021
- [Automated Reasoning Workshop](#), 2018