

David Kurniadi Angdinata

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Research interests

I currently work in the arithmetic of abelian varieties over global fields, specifically on the special values of their twisted L-functions in the context of the refined Birch and Swinnerton-Dyer conjecture. I am involved in the formalisation of arithmetic geometry in interactive theorem provers, being a pioneer in the development of the theory of elliptic curves in Lean. I am also interested in understanding local-global obstructions to rational points on varieties, via cohomological gadgets such as the Brauer group. Finally, I am passionate in pedagogical aspects of undergraduate mathematics education.

Refer to my website for a full list of projects, talks, conferences, teaching, and notes.

Education record

9/21 – 9/25	PhD Mathematics	<i>London School of Geometry and Number Theory</i>
	Supervised by Vladimir Dokchitser and Kevin Buzzard	
10/20 – 6/21	MASt Pure Mathematics	<i>University of Cambridge</i>
10/16 – 6/20	MEng Pure Mathematics and Computational Logic	<i>Imperial College London</i>
1/14 – 12/15	Singapore-Cambridge GCE A-level	<i>Temasek Junior College</i>
1/12 – 12/13	Singapore-Cambridge GCE O-level	<i>Anderson Secondary School</i>

Employment record

- 7/22 – 9/22 Research assistant at Huawei Technologies R&D UK Ltd
Summer internship on formalisation of modern mathematics in automated theorem proving
- 6/19 – 9/19 Cryptography engineer at Adjoint UK Ltd
Developed three highly polymorphic libraries for zero-knowledge proof protocols in Haskell:
- `galois-field` — an efficient implementation of finite field arithmetic
 - `elliptic-curve` — an extensible database of elliptic curve operations
 - `pairing` — a polymorphic library for bilinear pairing algorithms
- Published on Hackage as: `hackage.haskell.org/package/<name>`

Research projects

- ?/24 Formalising division polynomials, elliptic divisibility sequences, the torsion subgroup, and the Tate module of Weierstrass elliptic curves (joint with Peiran Wu and Junyan Xu)
Preprint in preparation
- 10/24 Algebraicity of Artin–Hasse–Weil L-series over global function fields
Preprint
- 1/24 L-values of elliptic curves twisted by cubic characters
Preprint submitted to the *Journal of the London Mathematical Society*
- 7/23 An elementary formal proof of the group law on Weierstrass elliptic curves in any characteristic (joint with Junyan Xu)
Published in the *14th International Conference on Interactive Theorem Proving*

Selected talks

- 5/9/24 Twisted elliptic L-values over global fields
Contributed talk for *Algebraic Number Theory* in Munich
- 31/7/24 Denominators of BSD quotients
Contributed talk for *Young Researchers in Algebraic Number Theory* in Oxford
- 26/6/24 Elliptic curves in mathlib
Workshop talk for *Formalising Algebraic Geometry* in Pasadena (Online)

- 19/6/24 Twisted L-values of elliptic curves
Contributed talk for *75th British Mathematical Colloquium* in Manchester
- 24/4/24 L-values of elliptic curves twisted by cubic characters
Seminar talk for *Linfoot Number Theory Seminars* in Bristol
- 25/8/23 Twisted elliptic L-values
Contributed talk for *Early Number Theory Researchers Workshop 2023* in Bielefeld
- 2/8/23 An elementary formal proof of the group law on Weierstrass elliptic curves in any characteristic
Conference talk for *14th International Conference on Interactive Theorem Proving* in Białystok
- 24/8/22 Formalisation of elliptic curves in Lean
Contributed talk for *Young Researchers in Algebraic Number Theory* in Glasgow
- 26/5/22 Elliptic curves and the Mordell–Weil theorem
Seminar talk for *London Learning Lean* in London
- 25/4/22 Elliptic curves in Lean
Workshop talk for *Huawei Technologies R&D UK Ltd* in Cambridge
- 4/12/20 Rank heuristics for elliptic curves
Seminar talk for *Part III Seminar Series* in Cambridge
- 13/9/19 Pairing-based elliptic curve cryptography
Presentation for *Adjoint UK Ltd* in London

Selected conferences

- 2–6/9/24 Algebraic Number Theory *Munich*
- 31/7–2/8/24 Young Researchers in Algebraic Number Theory *Oxford*
- 22–25/7/24 International Congress on Mathematical Software (co-organiser) *Durham*
- 24–28/6/24 Formalising Algebraic Geometry *Pasadena (Online)*
- 31/7–4/8/23 14th International Conference on Interactive Theorem Proving *Białystok*

Selected teaching

- 5/24 – 6/24 Supervisions for *Year 1 Term 3 research projects* *UCL*
Projects on how to tell if a number is prime and group theory and Rubik’s cube
- 1/24 – 3/24 Laboratory for *MATH60040 Formalising Mathematics* *ICL*
- 1/24 – 3/24 Problem classes and marking for *MATH0034 Number Theory* *UCL*
- 1/24 – 3/24 Tutorials for *6CCM351A Representation Theory of Finite Groups* *KCL*
- 7/23 Assistant for *Year 12 Maths Summer School: Logic and Proof* *UCL*
Assisted in an introductory course on logic and proof for sixth form students that spanned 5 days
- 5/23 – 6/23 Supervisions for *Year 1 Term 3 research projects* *UCL*
Projects on cryptography, sums of squares, and the axiom of choice
- 3/23 Teacher for *London Maths Outreach* *Harris Academy St John’s Wood*
Designed an introductory course on elliptic curves for sixth form students that spanned 4 weeks
- 1/23 – 3/23 Tutorials and marking for *5CCM251A Discrete Mathematics* *KCL*
- 10/22 – 12/22 Marking for *MATH0022 Galois Theory* *UCL*
- 10/22 – 12/22 Tutorials and marking for *5CCM224A Introduction to Number Theory* *KCL*
- 5/22 – 6/22 Supervisions for *Year 1 Term 3 research projects* *UCL*
Projects on continued fractions, cryptography, and Lean
- 10/21 – 12/21 Tutorials and marking for *MATH0014 Further Linear Algebra* *UCL*

Awards attained

- 2024 MAPS Faculty Education Award 2024 for individual excellence *UCL*
- 2021 – 2025 Full funding for 4-year PhD research [EP/S021590/1] *EPSRC*
- 2020 Governors’ MSci JMC Prize for best overall performance in final year *ICL*
- 2020 Donald Davies Prize for best final year individual project *ICL*

2020	Faculty of Engineering Dean's List	<i>ICL</i>
2018	Department of Mathematics UROP research studentship	<i>ICL</i>
2018	Faculty of Engineering Dean's List	<i>ICL</i>
2017	G Research Ltd Prize for academic excellence	<i>ICL</i>
2017	Faculty of Engineering Dean's List	<i>ICL</i>
2012 – 2015	Full 4-year school-based scholarship	<i>MOE Singapore</i>

Language skills

Languages	English, Mandarin/Hokkien, Indonesian/Malay, Japanese
Programming	Lean, Haskell, Python/SageMath, Magma, Java, C/C++, Prolog, PHP/MySQL
Tools	LaTeX, XHTML/CSS, Git, Stack, Vim

Miscellaneous activities

2022 – 2023	Private tutor for mathematics and computer science in TutorChase and ElitePrep
2020 – 2021	Owner and moderator of the Cambridge Part III Mathematics Discord server
2018 – 2021	Live-Texed lecture notes for geometry, algebra, and number theory available on GitHub
2019 – 2020	Problems curator for the Imperial College Mathematics Competition
2018 – 2020	Organiser for the Imperial College undergraduate mathematics colloquium
2012 – 2018	Solved 180 Project Euler problems primarily in Java and Haskell