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

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 and published the Haskell libraries `galois-field`, `elliptic-curve`, and `pairing`

Research papers

?/25	Computing motivic L-functions over global function fields Preprint in preparation
?/25	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 submitted to the *Bulletin of the London Mathematical Society*
1/24	L-values of elliptic curves twisted by cubic characters Preprint submitted to the *Canadian Journal of Mathematics*
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*

Mathlib contributions

Elliptic curves	The `discriminant` of a cubic equation, `Weierstrass` equations and their changes of variables, the group law in `affine` coordinates, the group law in `Jacobian` coordinates, the group law in `projective` coordinates, `division polynomials` and their degrees, the theory of `elliptic divisibility sequences`
Ring theory	`maximal ideals` and `maximal spectra`, the ring of `S-integers` of a Dedekind domain, the `Selmer group` of a Dedekind domain

Selected talks

13/2/25 Algebraising foundations of elliptic curves
Seminar talk for *Formalisation of Mathematics with Interactive Theorem Provers* in Cambridge

17/1/25 Division polynomials of elliptic curves
Contributed talk for *Lean Together 2025* in Zoom (Online)

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

27/7–2/8/25	Rational Points 2025	*Schney*
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

1/25 – 3/25 Laboratory for *MATH60040 Formalising Mathematics* *ICL*

1/25 – 2/25 Assistant for *London Maths Outreach* *UCL*
Assisted in an introductory course on elliptic curves for sixth form students that spanned 4 weeks

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* Designed a introductory course on elliptic curves for sixth form students that spanned 4 weeks	*Harris Academy St John's Wood*
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* Projects on continued fractions, cryptography, and Lean	*UCL*
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	*ICL*
2018	Department of Mathematics UROP research studentship	*ICL*
2018	Faculty of Engineering Dean's List	*ICL*
2017	G Research Ltd Prize for academic excellence	*ICL*
2017	Faculty of Engineering Dean's List	*ICL*
2012 – 2015	Full 4-year school-based scholarship	*MOE Singapore*

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