David Kurniadi Angdinata

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Research interests

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

Education record

9/21 – 9/25	PhD Mathematics	*London School of Geometry and Number Theory (LSGNT)*
10/20 – 6/21	MASt Pure Mathematics	*University of Cambridge*
10/16 – 6/20	MEng Pure Mathematics and Computational Logic	*Imperial College*
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 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, and
- `pairing` — a polymorphic library for bilinear pairing algorithms.

Published on Hackage as: `hackage.haskell.org/package/<name>`

Research papers

10/24 Algebraicity of Artin–Hasse–Weil L-series over global function fields
Preprint in preparation

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 Fourteenth International Conference on Interactive Theorem Proving

Research projects

1/24 – Twisted L-values of elliptic curves over global function fields

7/23 – Formalising division polynomials, elliptic divisibility sequences, the torsion subgroup, and the Tate module of Weierstrass elliptic curves (joint with Peiran Wu and Junyan Xu)

12/21 – 6/22 The Mordell–Weil theorem (mini project, LSGNT)

12/21 – 4/22 The Euler system of Heegner points (mini project, LSGNT)

10/19 – 6/20 Arithmetic statistics for elliptic curves (master's thesis, Imperial College)

7/19 – 9/19 Class field theory and applications (UROP, Imperial College)

8/18 – 9/18 The arithmetic of elliptic curves (UROP, Imperial College)

Talks given

5/9/24 Twisted elliptic L-values over global fields *contributed talk for Algebraic Number Theory*

31/7/24	Denominators of BSD quotients	*contributed talk for Y-RANT*
4/7/24	Adèles and cohomology	*study group*
26/6/24	Elliptic curves in mathlib	*workshop talk for Formalising Algebraic Geometry*
19/6/24	Twisted L-values of elliptic curves	*contributed talk for BMC*
20/5/24	Diophantine equations	*year 1 post exams colloquia*
24/4/24	L-values of elliptic curves twisted by cubic characters	*Linfoot Number Theory Seminars*
13/3/24	Kolyvagin's theorem	*study group*
5/12/23	The Brauer–Manin obstruction	*London Junior Number Theory Seminar*
19/10/23	Congruences of twisted L-values	*study group*
5/10/23	The group law on an elliptic curve	*postgraduate seminar*
25/8/23	Twisted elliptic L-values	*contributed talk for ENTR*
2/8/23	An elementary formal proof of the group law on Weierstrass elliptic curves in any characteristic	*conference talk for ITP*
18/1/23	Introduction to abelian varieties over finite fields	*study group*
17/1/23	Class number formula, à la Tate	*London Junior Number Theory Seminar*
30/11/22	Examples of Brauer groups	*study group*
22/11/22	Tate's thesis and epsilon factors	*study group*
29/9/22	Elliptic curves and Mordell's theorem	*workshop talk for Xena Project*
24/8/22	Formalisation of elliptic curves in Lean	*contributed talk for Y-RANT*
5/8/22	Étale cohomology	*study group*
5/7/22	The Tate–Shafarevich and Brauer groups	*study group*
26/5/22	Elliptic curves and the Mordell–Weil theorem	*talk for London Learning Lean*
10/5/22	The Euler system of Heegner points	*London Junior Number Theory Seminar*
5/5/22	Kolyagin's work on the BSD conjecture	*mini project presentation*
25/4/22	Elliptic curves in Lean	*workshop talk in Huawei*
6/10/21	Ideal class groups	*introductory talk for LSGNT*
4/12/20	Rank heuristics for elliptic curves	*Part III Seminar Series*
22/6/20	Arithmetic statistics for elliptic curves	*master's thesis presentation*
11/3/20	The ideal class group is a Tate–Shafarevich group	*interview presentation for ESAGA*
4/10/19	Cryptography engineering at Adjoint UK Ltd	*industrial placement presentation*
13/9/19	Pairing-based elliptic curve cryptography	*lunch talk in Adjoint*
16/1/19	An unusual cubic representation problem	*undergraduate mathematics colloquium*

Conferences attended

18–22/11/24	Workshop on p-adic Geometry	*Singapore*
3–4/10/24	Arithmetic Geometry of K3 Surfaces and Related Areas	*London*
2–6/9/24	Algebraic Number Theory	*Munich*
21–25/8/24	The Third Journal of Number Theory Biennial Conference (JNT)	*Cetraro*
31/7–2/8/24	Young Researchers in Algebraic Number Theory (Y-RANT)	*Oxford*
22–25/7/24	International Congress on Mathematical Software (co-organiser)	*Durham*
24–28/6/24	Formalising Algebraic Geometry	*Online*
17–20/6/24	75th British Mathematical Colloquium (BMC)	*Manchester*
13–14/6/24	London-Paris Number Theory Seminar (LPNTS)	*London*
25–29/3/24	Lean for the Curious Mathematician 2024 (LftCM)	*Marseille*
9–12/1/24	Lean Together 2024	*Online*
6–8/12/23	Modular Curves and their Arithmetic	*Coventry*
18–22/9/23	Hausdorff School: Formal Mathematics and Computer-Assisted Proving	*Bonn*
11–15/9/23	Algebra and Number Theory In Conversation (ANTIC)	*Manchester*

11–22/9/23	Rational Points on Modular Curves	*Bengaluru/Online*
6–8/9/23	Young Researchers in Algebraic Number Theory (Y-RANT)	*Cambridge*
23–25/8/23	Early Number Theory Researchers Workshop 2023 (ENTR)	*Bielefeld*
31/7–4/8/23	Fourteenth International Conference on Interactive Theorem Proving (ITP)	*Białystok*
26–30/6/23	Masterclass: Formalisation of Mathematics	*Copenhagen*
12–14/6/23	London-Paris Number Theory Seminar (LPNTS)	*London*
22–26/5/23	Formalization of Cohomology Theories	*Banff/Online*
8–19/5/23	Arithmetic Statistics	*Marseille*
10–14/4/23	Arithmetic, Algebra, and Algorithms	*Edinburgh/Online*
30/1–10/2/23	Symposium on Arithmetic Geometry and its Applications (SAGA)	*Marseille*
23–25/8/22	Young Researchers in Algebraic Number Theory (Y-RANT)	*Glasgow*
15–19/8/22	Mordell 2022	*Cambridge*
8–12/8/22	Elliptic Curves 2022	*Clyro*
6–9/6/22	73rd British Mathematical Colloquium (BMC)	*London*

Teaching activities

5/24 – 6/24	Supervisions for Year 1 Term 3 research projects: a project on how to tell if a number is prime and a project on group theory and Rubik's cube	*University College*
1/24 – 3/24	Problem classes for MATH40003 Linear Algebra and Groups	*Imperial College*
1/24 – 3/24	Laboratory for MATH60040 Formalising Mathematics	*Imperial College*
1/24 – 3/24	Problem classes and marking for MATH0034 Number Theory	*University College*
1/24 – 3/24	Tutorials for 6CCM351A Representation Theory of Finite Groups	*King's College*
10/23 – 12/23	Tutorials for MATH0005 Algebra 1	*University College*
10/23 – 12/23	Tutorials and marking for 4CCM121A Introduction to Algebra	*King's College*
7/23	Logic and proof summer course: assisted in an introductory course on logic and proof for sixth form students that spanned five full days	*University College*
5/23 – 6/23	Supervisions for Year 1 Term 3 research projects: a project on cryptography, a project on sums of squares, and a project on the axiom of choice	*University College*
3/23	London Maths Outreach: designed and taught an introductory course on elliptic curves for sixth form students that spanned four weeks	*Harris Academy St John's Wood*
1/23 – 3/23	Problem classes and marking for MATH0034 Number Theory	*University College*
1/23 – 3/23	Marking for MATH0037 Logic	*University College*
1/23 – 3/23	Marking for MATH0050 Logic	*University College*
1/23 – 3/23	Tutorials and marking for 5CCM251A Discrete Mathematics	*King's College*
10/22 – 12/22	Marking for MATH0022 Galois Theory	*University College*
10/22 – 12/22	Marking for Foundations of Mathematics	*University College*
10/22 – 12/22	Tutorials and marking for 5CCM224A Introduction to Number Theory	*King's College*
5/22 – 6/22	Supervisions for Year 1 Term 3 research projects: a project on continued fractions, a project on cryptography, and two Lean projects	*University College*
1/22 – 3/22	Drop-in sessions for MATH0014 Analysis 2	*University College*
10/21 – 12/21	Tutorials and marking for MATH0014 Further Linear Algebra	*University College*
1/20 – 3/20	Tutorials and marking for CO141 Reasoning about Programs	*Imperial College*
1/20 – 3/20	Tutorials and marking for CO150 Graphs and Algorithms	*Imperial College*
10/19 – 12/19	Tutorials and marking for CO140 Logic	*Imperial College*
1/19 – 3/19	Tutorials and marking for CO141 Reasoning about Programs	*Imperial College*
10/18 – 12/18	Tutorials and marking for CO140 Logic	*Imperial College*
10/18 – 12/18	Tutorials and marking for CO142 Discrete Structures	*Imperial College*

Study groups

5/24 – 7/24	Open problems in number theory (10 talks)	*University College*
5/24 – 7/24	Class field theory (9 talks)	*University College*
1/24 – 3/24	The conjecture of Birch and Swinnerton-Dyer (11 talks)	*University College*
10/23 – 12/23	What am I doing at the moment (8 talks)	*University College*
1/23 – 3/23	Abelian varieties over finite fields (11 talks)	*University College*
11/22 – 3/23	The Brauer–Manin obstruction (13 talks, co-organiser)	*Online*
10/22 – 12/22	Galois representations and root numbers (10 talks)	*University College*
6/22 – 8/22	Étale cohomology (9 talks, co-organiser)	*Online*
5/22 – 7/22	Curves over function fields (8 talks)	*University College*

Awards attained

2024	MAPS Faculty Education Award 2024 for individual excellence	*University College*
2021 – 2025	Full funding for 4-year PhD research	*EPSRC*
2020	Governors' MSci JMC Prize for best overall performance in final year	*Imperial College*
2020	Donald Davies Prize for best final year individual project	*Imperial College*
2020	Faculty of Engineering Dean's List	*Imperial College*
2018	Department of Mathematics UROP research studentship	*Imperial College*
2018	Faculty of Engineering Dean's List	*Imperial College*
2017	G Research Ltd Prize for academic excellence	*Imperial College*
2017	Faculty of Engineering Dean's List	*Imperial College*
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