

# Curriculum Vitae

Lewis Combes

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## EDUCATION

PhD in Mathematics, October 2019 - present, University of Sheffield.  
Supervised by Haluk Şengün.  
Viva: January 2024

MMath in Mathematics, 2014-18, University of Warwick  
Thesis: *Mathematics of Bitcoin: The ECDSA*

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## CONFERENCE TALKS

*Period polynomials of Bianchi modular forms* (lightning talk)  
LMFDB, Computation, and Number Theory (LuCaNT)  
ICERM, Brown University, 2023

*Computing Selmer groups attached to mod  $p$  Galois representations*  
COGENT Summer school  
Insitut Fourier, 2022  
<https://www.youtube.com/watch?v=HvUr1zPRFAE>

*Selmer groups attached to mod  $p$  Bianchi modular forms*  
Young Researchers in Algebraic Number Theory  
University of Bristol, 2021

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## PUBLICATIONS

Lewis Combes, *Bianchi period polynomials: Hecke action and congruences* (Research in Number Theory, accepted December 2023, arXiv 2306.10877)

Lewis Combes, John Jones, Jennifer Paulhus, David Roe, Manami Roy, Sam Schiavone, *Creating a dynamic database of finite groups* (forthcoming)

Elisabeth (Yin Ting) Chan and Lewis Combes, *Expressions for weight 2 cusp forms in holomorphic eta quotients* (forthcoming)

## TEACHING

LMS Undergraduate Summer School 2023

Mini-course: *Some topics in computational number theory*

Selected student feedback:

*“I particularly enjoyed the number theory course by Lewis Combes! He is a great teacher, the topics he talked about were fascinating and the exercises were really fun.”*

*“Lectures were delivered with great passion and you would not guess that it was delivered by a PhD student instead of an experienced lecturer.”*

*“I cannot overstate how good Lewis Combes’ course was, being the most enjoyable”*

Supervised Sheffield Undergraduate Research Internship Project *Eta Expressions Associated to Elliptic Curves* with Elisabeth (Yin Ting) Chan (Summer 2022)

Graduate Teaching Associate for:

Foundation Year Mathematics (for science, engineering) (2023)

Foundations of Mathematics (2022-23)

Advanced Calculus and Linear Algebra (2022)

Algebra (2020-21)

Duties: leading tutorials, marking homework, supporting students.

Assistant demonstrator for:

Scientific Computing and Simulation (2021-22)

Analysis (2019-20)

Duties: supporting lead demonstrator, marking homework, supporting students.

MSc Dissertation Support (2019)

Duties: Supporting students with quality of written work.

Analysis and Algebra revision workshop (2022)

Duties: devised and delivered a workshop for students with challenging academic circumstances.

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## SEMINARS

ShEAF PGR Seminar (Sheffield)—*The 2-adic Collatz conjecture*

November 2023

Automorphic representations seminar (Sheffield)—*“Hecke characters, Maass forms, and automorphic forms”*

February 2023

Towards Arithmetic Geometry (Sheffield)— *“Hilbert’s nullstellensatz and sheaves”*  
October 2021

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## RESEARCH INTERESTS & SKILLS

Computational number theory, with specific focus on Bianchi modular forms, cohomology of arithmetic groups, and Selmer groups. Proficient coding with Magma; other experience with: Sagemath, Python, HTML, Javascript.