Curriculum Vitae

Lewis Combes

Education

PhD in Mathematics, October 2019 - April 2024, University of Sheffield.
Supervised by Haluk Şengün.

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

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)

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

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.

Seminars

University of Nottingham Number Theory Seminar— *"Period polynomials of level 1 Bianchi modular forms"*
February 2024

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 nullstallensatz and sheaves"*
October 2021

Conferences & workshops attended

LMFDB, Computation and Number Theory 2023, Brown University, July 2023.

Spring School in Arithmetic Statistics, Aix-Marseille Université, May 2023

Cohomology, Geometry and Explicit Number Theory, Institut Fourier, June 2022.

Elliptic curves 2022, Baskerville Hall, August 2022.

Young Researchers in Algebraic Number Theory, University of Bristol (virtual), August 2021.

Groups in the LMFDB, Brown University (virtual), June 2020.

Young Researchers in Algebraic Number Theory, University of Warwick, November 2019.

Research interests & special skills

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