Curriculum Vitae

Lewis Combes

February 25, 2025

Employment

Postdoctoral Research Fellow (Pure Mathematics and Computation), October 2024 - present, University of Sydney.
Supervised by John Voight and Geordie Williamson.

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 10

Lewis Combes, John Jones, Jennifer Paulhus, David Roe, Manami Roy, Sam Schiavone, *Creating a dynamic database of finite groups*
arXiv 2409.09189

Elisabeth (Yin Ting) Chan and Lewis Combes, *Expressions for weight 2 cusp forms in holomorphic eta quotients*
arXiv 2407.05748

Awards

School of Mathematics and Statistics PhD Stipend Continuation Grant (University of Sheffield, 2 months)

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:
"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 and conference talks

University of Sydney Computational Algebra Seminar— *"Computing mod p Selmer groups"*
February 2025

University of Sydney Informal Friday Seminar— *"The Magic of L-functions"*
November 2024

Young Researchers in Algebraic Number Theory— *What is a Bianchi modular form? And why does anyone care?*
August 2024

London Number Theory Seminar— *"Period polynomials of Bianchi modular forms"*
May 2024

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

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

Automorphic representations seminar (Sheffield)— *"Hecke characters, Maass forms, and automorphic forms"*
February 2023

Conferences & workshops attended

Young Researchers in Algebraic Number Theory VI, University of Oxford, August 2024.

Algorithmic Number Theory Symposium XVI, MIT, July 2024.

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, Selmer groups and periods. Highly proficient coding with Magma; other experience with: Sagemath, Python, HTML, Javascript.