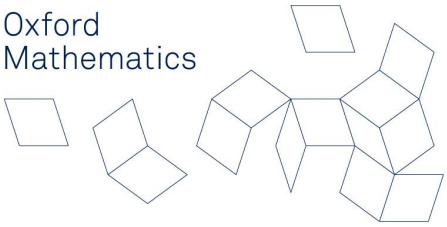
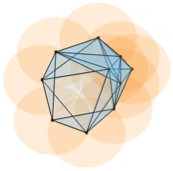
Oxford Mathematics



Digital Economy — Transforming Business and Society

horizon DIGITAL ECONOMY RESEARCH



Algebraic Topology: Computation, Data Analysis, and Applications

Location: Mathematical Institute, University of Oxford, Oxford OX2 6GG. Rooms: L4 and L3.
Date: 24 February 2015. Time: 8:40 am – 6 pm.

Objective

We will explore recent progress and outlook for computation, data analysis, and applications of methods from computational topology. The aim is to have active discussions about computational topology to study real-world problems. We will discuss fascinating science as well as implications for the RCUK Digital Economy.

Schedule

Coffee outside L4 — 8:40 am

Session 1 in L4 –chair Peter Grindrod — **9:10 – 10:35 am**

Introduction to workshop (9:10 – 9:20)
Matthew Wright (IMA) Introduction to persistent homology (9:20 – 9:40)
Rubén Sánchez García (Southampton) Topology and networks (9:45 – 10:05)
Michael Lesnick (IMA) Induced matchings of barcodes and algebraic stability (10:10 – 10:30)

Coffee Break — 10:35 – 11:00 am

Session 2 in L4 –chair Ulrike Tillmann — **11:00 am – 12:00 pm**

Ginestra Bianconi (QMUL) Emergence on Network Geometry (11:00 – 11:20)
Florian Klimm (Oxford) Topological data analysis for complex contagions (11:25 – 11:40)
Discussion [focus on theoretical advances] (11:40 – 12:00)

Lunch (catered outside L4) — 12:00 – 1:15 pm

Session 3 in L3 –chair Heather Harrington — **1:15 – 3:30 pm**

Nina Otter (Oxford) Software for persistent homology (1:15 – 1:35)
Matthew Wright (IMA) Multidimensional persistence computation (1:40 – 2:00)
Giovanni Petri (ISI Foundation) Homological scaffolds of functional brain networks (2:05 – 2:20)
Bernadette Stoltz (Oxford) Computational topology and neuroscience (2:25 – 2:40)
Robert MacKay (Warwick) Topology from time series: 22 years on (2:45 – 3:05)
Discussion [focus on computation and applications] (3:10 – 3:30)

Coffee break — 3:30 – 3:50 pm

Session 4 in L3 –chair Mason Porter — **3:55 – 6:00 pm**

Vitaliy Kurlin (Durham) A homologically persistent skeleton in computer vision (3:55 – 4:15)
Robert Leese (Smith Institute) How might Topological Data Analysis become transformative, dependable, actionable? (4:20 – 4:40)
Panel and group discussion on future directions (4:45 – 5:45)
Closing remarks (5:45 – 6:00)