DIVISION OF MATHEMATICAL AND PHYSICAL SCIENCES

MSc in Mathematics and the Foundations of Computer Science
Report of the Examiners (2013-14)

Part I

1. Results

Entries	18
Passed	7
Distinctions Awarded	11
Failed TT hurdle	0
Failed	0

2. Vivas

Eighteen candidates who submitted dissertations had vivas.

3. Number of scripts multiply marked

Each written assignment (mini-project) was marked by the lecturer for that course (who was therefore appointed as an assessor if he was not already an examiner) and was also marked by a 2nd assessor and then moderated by the examiners. Each dissertation was marked by one reader, and then moderated by the examiners taking into consideration comments supplied by the dissertation supervisor.

4. Distribution of topics

Of the 40 topics available, the numbers taken were as follows:

Michaelmas Term	*Passed*	*Failed*
Algebraic Geometry	1	0
Algebraic Topology	3	0
Analytic Number Theory	2	0
Analytic Topology	1	0
Automata Logic & Games	2	0
Commutative Algebra	5	0
Introduction to Representation Theory	6	0
Categories Proofs & Processes	8	0
Foundations of Computer Science	3	0
Quantum Computer Science	5	0
Combinatorics	8	0
Machine Learning	3	1
Modular Forms	2	0
Model Theory	2	0
Probability & Computing	2	0

Hilary Term	*Passed*	*Failed*
Algebraic Number Theory	2	0
Axiomatic Set Theory	3	0
Distributional Models of Meaning	2	0
Group Theory and an Intro to Character Theory	4	0
Homological Algebra	2	0
Infinite Groups	2	0
Representation Theory of Symmetric Groups	2	0
Computational Algebraic Topology	4	0
Elliptic Curves	5	0
Graph Theory	6	0
Lambada Calculus & Types	4	0
Probabilistic Combinatorics	8	0

Categorical Quantum Mechanics	5	1
Networks	3	1

Trinity Term	*Passed*	*Failed*
Computational Number Theory	3	0
Extrenal Graph Theory	1	0

5. Assessors
There were 42 assessors appointed to help with the examination.

A. Changes in examination methods and procedures this academic year
None

B. Changes in examining methods and procedures envisaged
None

Part II
40 courses were offered. 9 courses failed to attract any students. The performance was of a high standard, with 8 mini-project scripts receiving marks of 90 and above, 32 receiving 80 and above, 37 receiving 70 and above, 20 receiving 60 and above, 12 receiving 50 and above, and 3 failures. The overall standard of dissertations was very high this year. 6 were awarded a grade of 90 and above, 4 at 80 and above, 4 at 70 and above, 3 at 60 and above, 1 at 50 and above, and 0 fail.

The dissertation topics, which all had some (theoretical or practical) computing aspect to them, were as follows:-

- Classification of Quantum Teleportation Procedures by Mutually Unbiased Bases and Latin Squares
- Density Matrices in Compositional Distributional Models of Meaning
- "Three Variables Ought to Be Enough for Anybody" Or: A General Case for First-Order Logic of Order and Metric With the Three-Variable Property"
- Hypergraph Colouring
- Constructive aspects of Lovasz Local Lemma and applications to graph colouring
- C^infinity Algebraic Geometry
- Endomorphism rings of some permutation modules
- Graceful and range-relaxed graceful labellings of graphs
- Intersecting families of sets
- Differentially closed fields of characteristic 0 and quasiminimality
- Stable commutator length of amenable groups
- On Homotopy Quantum Field Theory
- Computations motivated by the p-adic Birch and Swinnerton-Dyer Conjecture
- Explict Methods for the Birch and Swinnerton-Dyer Conjecture
- Biclique Partitions of Graphs
- On clique minors of geometric graphs
- Frobenius algebras in Functor Categories
- On the Topology of Measurement Contexts for Asymmetric Multipartite Spin Systems

Each candidate showed a good knowledge of his or her chosen area in the oral examination.

5. Examination Recommendations

This year if the assessor was not able to attend they had to ensure that they were represented at the viva.

In addition, supervisors were invited to both write an assessment and attend the vivas which seemed to be appreciated by both student and supervisor. It was also advantageous to have more overlap in score assessment which resulted in an improved balancing of marks. It is recommended that this practice continues.

V Flynn
M Escardo
A Wilkie
B Coecke (Chairman)

29/09/14