Sir Ronald Aylmer Fisher: Fisher in the 21st Century

21/22 April 2022, Bateman Auditorium and webinar

21 April

9.00-9.10 Introduction by Organisers

9.10-10.10 Nancy Reid FRS
Department of Statistical Sciences, University of Toronto
http://www.utstat.utoronto.ca/reid/

"Fisher's contributions to mathematical statistics"

This talk will describe how the fundamental concepts of statistical inference set out by Fisher continue to inform statistical practice and theory today.

10.10-11.10 Alex Aylward
Departmental Lecturer in the History of Science, Faculty of History, University of Oxford
https://www.history.ox.ac.uk/people/dr-alex-aylward

"On reading a book of two halves: A long history of *The Genetical Theory of Natural Selection*"

R. A. Fisher's *The Genetical Theory of Natural Selection* (1930) is among the most celebrated and influential works in modern evolutionary thought. Its final five chapters on eugenics, meanwhile, are notorious. This talk takes a long view, following the book through its writing, publication, reception, and longer legacies. In particular, I'll ask how author and readers understood and negotiated the relationship between the book's 'scientific' and 'eugenical' halves.

11.10-11.40 Coffee

11.40-12.40 Alan Grafen FRS
Department of Zoology, University of Oxford
https://www.zoo.ox.ac.uk/people/professor-alan-grafen-frs

"Fisher's legacy in Darwinian biology"

The "Darwinian biology" of my title is what Darwin would have understood with his very limited knowledge of heredity and his focus on the improving power of natural selection on organismal design. Fisher's legacy includes specific contributions on the advantages of sexual over asexual reproduction, sexual selection, sex ratio theory and mimicry. He also showed in what circumstances natural selection has fine-grained creative power; and provided a template model for proving mathematically that natural selection is an improving process and, crucially, proving what counts as improvement.

12.40-14.00 Lunch

14.00-15.00 John Aston
Statistical Laboratory, University of Cambridge
http://www.statslab.cam.ac.uk/~jada2/
https://www.maths.cam.ac.uk/person/jada2

"Fisher in the age of data science"

Statistics, with computer science, forms the bedrock of data science, yet many statistical concepts are being rediscovered as data science comes of age. In this presentation, I will look at the role that some of the statistical ideas developed by Fisher play within data science, and indeed the role that statistics and data science should now play within society.

15.00-16.00 Jenny Bangham
Wellcome University Award Lecturer; School of History, Queen Mary University of London
https://www.qmul.ac.uk/history/people/academic-staff/profiles/banghamjenny.html

"Blood, race and transfusion: Fisher's work with the wartime Galton Serum Unit"

This talk considers Fisher's work on the genetics of human blood groups, and specifically how his serological laboratory was co-opted during the Second World War to provide practical support for the new Emergency Blood Transfusion Service. I will describe how Fisher and his colleagues in the unit carried out human genetics research using the blood and bureaucracies of wartime public health.

16.00-16.30 Tea

16.30-17.30 Anne Ferguson-Smith FRS
Arthur Balfour Professor of Genetics, Department of Genetics, University of Cambridge
https://www.gen.cam.ac.uk/directory/anne-ferguson-smith

"Epigenetic variation within and across generations"

Epigenetic modifications to DNA influence observable outcomes. Such modifications are dynamic and have the potential to be influenced by the environment, however the functional relevance of this remains the subject of some debate. I will explore the contribution of epigenetics to variation between individuals and whether or not epigenetic effects are heritable across generations.

17.30-18.30 Aylwyn Scally
Department of Genetics, University of Cambridge
https://www.gen.cam.ac.uk/directory/aylwyn-scally

"Chance and ancestry in human genetics"

The nature of ancestry and what genetic evidence tells us about it; how we understand and represent human populations and their genetic differences; the contingency of ancestry and concepts of 'innateness.

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9.00-10.00 Qingyuan Zhao
University Assistant Professor of Statistics, Department of Pure Mathematics and Mathematical Statistics, and a Fellow of the Corpus Christi College, Cambridge
http://www.statslab.cam.ac.uk/~qz280/

"Fisher, statistics, and randomisation"

One of Fisher's most important scientific contributions is the paradigm of randomized experiments. I will try to trace the origin of this idea and highlight how it is rooted in Fisher's cross-disciplinary interest in mathematics, biology, statistics, and genetics. I will also try to review the debate between Fisher and Neyman on the foundation of statistical inference and Fisher's reservations about observational studies.

10.00-11.00 Richard Durbin FRS
Department of Genetics, University of Cambridge and Wellcome Sanger Institute
https://www.gen.cam.ac.uk/directory/richard-durbin
https://www.sanger.ac.uk/person/durbin-richard/

"Population genetic variation, inferred and observed"

I will address how the study of genetics has changed in the era of genomic science. During the second half of the twentieth century genetic research focused on molecular mechanisms and was quite distant from Fisher's interests. Whole genome sequencing has led to the increasing reintegration of this gene-based view with population genetics, and also with the requirement for statistical methodology, the two subjects that Fisher pioneered a century ago.

11.00-11.30 Coffee

11.30-12.30 Robert Proctor (via Zoom)
Professor of History and, by courtesy, of Medicine
Department of History, Stanford University
https://history.stanford.edu/people/robert-n-proctor

"Why did Big Tobacco love (and fund) eugenicists like R.A. Fisher?"
Fisher's Conspicuous Howler

In 1957, Sir Ronald ridiculed the idea of cigarettes causing cancer as "a catastrophic and conspicuous howler." Cigarette makers loved his "itch in the lung hypothesis," the idea that cancer gives its victims an "itch" that only smoking can scratch, confounding cause and effect. Fisher became a recruiter for the industry, and Big Nicotine ended up funding thousands of scholars, including at least 25 who went on to win the Nobel Prize. Here we

explore the scope of this deadly collaboration, focusing on why eugenicists were so willing to shill for the industry.

12.30-14.00 Lunch

14.00-15.00 Rachell Sanchez-Rivera
Research Fellow, Gonville & Caius, Affiliate Lecturer, ReproSoc, Department of Sociology, University of Cambridge
https://research.sociology.cam.ac.uk/profile/dr-r-sanchez-rivera

"The histories and legacies of eugenics and its intersections with 'race', class, disability, and gender"

This presentation will examine how historically specific ideas of "race", ability, gender and class became "scientific truths". I will also examine the legacies and contemporary implications of having the "respectability" and "objectivity" of science behind racist beliefs. In turn, this presentation will examine how these seemingly or assumed scientific truths slip in contemporary academic, cultural, social, and nationalistic understandings of science, medicine, and politics. I will use examples from different settings and contexts with a special focus on the Americas.

15.00-16.00 Adam Rutherford
Lecturer, Genes, Evolution and Environment, University College London, BBC Broadcaster
https://www.ucl.ac.uk/biosciences/people/dr-adam-rutherford
https://www.adamrutherford.com/

"Control: the dark history and troubling present of eugenics"

Many of the scientific giants on whose shoulders we rightly stand, were also enthusiastic supporters of eugenics. RA Fisher, and others, were part of a movement that attempted to confidently martial a neonatal and profoundly immature science into an ideology. This combination of misplaced scientific confidence and political will formed the justification for the sterilisation of hundreds of thousands, and paved the way directly to the Holocaust.