BRITISH SOCIETY FOR THE HISTORY OF MATHEMATICS

Research in Progress

Saturday 22 February 2025 in the Shulman Auditorium, The Queen's College, Oxford

Programme

09:45–10:05	Registration	
10:05–10:15	BSHM	Welcome
10:15–10:45	THOMAS BERTHOD SPHERE laboratory; Université Paris Cité	*Using Diagrams in Analysis: The Example of René Baire*
10:45–11:15	MEGAN BRIERS Max Planck Institute for the History of Science; Technische Universität Berlin	*Controversy over Correspondence: Richarda Airy and the Discovery of Neptune*
11:15–11:45	Refreshment Break	
11:45–12:15	STEVEN ABBOTT-WILLIAMS Swansea University	*Data in Sports; The Case of Wisden*
12:15–12:45	JASON YIP[1] & TOM BRIGGS [1]Middlesex University	*Using History as a Pedagogical Tool for Enhancing Affective Development and Academic Performance in Year 7 and 8 Mathematics Classrooms*
12:45–13:45	Lunch and Poster Display	
13:45–14:15	PETRA STANKOVIĆ University of Oxford	*Russian Mathematicians at the Serbian Academy of Arts and Sciences Post World War I*
14:15–14:45	ELISA DALGALARRONDO SPHERE laboratory/Cité du Genre; Université Paris Cité	*The 'Femmes et mathématiques' Seminar at the Université d'Orsay: A Window on Women's Perceptions of Their Place in Mathematics in France (1974)*
14:45–15:00	DAVID THORSTEINSSON University of St Andrews (BSHM Undergraduate Essay Prizewinner)	*Quantity, Culture, and Cognition: The Role of Agriculture in Shaping Numerical Concepts*
15:00–15:30	Refreshment Break	
15:30–15:45	ANDREW HALYBURTON University of St Andrews (BSHM Undergraduate Essay Prizewinner)	*The Diffusion of Hindu-Arabic Numerals Throughout Late Medieval Europe*
15:45–16:15	ELIFE ÇETINTAS Bergische Universität Wuppertal	*The Term 'Structure' in Mathematical Discourse from 1889 to 1942: A Bibliometric Study by Using the* Jahrbuch über die Fortschritte der Mathematik
16:15–16:45	KATE HINDLE University of St Andrews	*D'Arcy Thompson and the History of Mathematics in the Early 20th Century*
16:45–17:00	Comfort Break	
17:00–18:00	NORBERT SCHAPPACHER Université de Strasbourg	Invited lecture: *How to Embed Research on the History of 20th-century Mathematics into Historical Epistemology*
18:00	Close of Meeting	

Version of 21 January 2025

Abstracts

Steven Abbott-Williams (Swansea University)

Data in Sports; The Case of Wisden

In this paper I examine the role that data and tabulated numbers have played in the understanding and development of statistical methodologies within sports, focusing on their historical and mathematical significance. Since 1864 Wisden has offered a unique lens in which the evolution of data presentation, collection, and analysis can be shown. The almanac uses a systematic approach to organising match scores, player statistics, and highlights broader trends which can be a tool for showcase Edwardian data culture.

This research also argues that Wisden serves not only the purpose of a sporting chronicle but also acts as a testament to the era's fascination with the power of numbers and their ability to narrate, analyse, and immortalise human achievements.

Quantification in sport has risen from a hobbyist's endeavour to a grand tool for data analysis and this is evident in the form of the Wisden's Almanak, in this case it reflects the British society and its engagement with numbers. This case ties in with my broader research goals for looking at data in other sports such as football and baseball during the same time period, comparing their utilisation of the data they collect and evaluating it within a data lifecycle framework as such with football which didn't see much data utilisation until the 1930s.

Thomas Berthod (SPHERE laboratory; Université Paris Cité)

Using Diagrams in Analysis: The Example of René Baire

In *Visual Thinking in Mathematics: An Epistemological Study*, Marcus Giaquinto wonders about the function and utility of diagrams in mathematics. In particular, he devotes a chapter of his study to the case of the field of analysis. In this presentation, we will briefly present Giaquinto's theses to discuss them in the light of René Baire's mathematical practice. Baire was a French mathematician who, thanks in particular to the use of set theory concepts, was able to establish several important results in real analysis. The use of Cantor's theory in analysis was rare in mathematics at the time, particularly in France. Baire's thesis, entitled 'On functions of real variables' ('Sur les fonctions de variables réelles'), published in 1899, is one of his most important texts. In his thesis, René Baire uses a diagram to prove an equivalence between two particular mathematical problems in analysis: on the one hand, a problem involving a function in several variables and, on the other hand, a problem involving series of functions. We will use this example to discuss Giaquinto's conclusions about the role of diagrams in analysis. Although the presentation focuses on the case of the previous diagram, we will also extend our study to various other Baire diagrams, though we will discuss them more quickly.

Baire's use of a diagram in his analytical proof is unexpected. In the 1890s, following the movement of the arithmetisation of analysis, to which René Baire fully subscribed, analysis tended to develop in direct opposition to geometrical methods. In such a movement, any recourse to geometrical arguments or to an intuition becoming from spatial representations of any kind was therefore absolutely forbidden. Why did Baire feel the need to use a diagram? Perhaps it could be argued that the diagram is merely an illustrative tool and could be dispensed with altogether. However, as we shall see, this is not the case here. On the contrary, as we shall show, the diagram has a very particular function and plays an essential role in the development of the argument of the proof studied.

The importance of this diagram becomes even clearer when Baire reuses it in his book *Lessons on Discontinuous Functions* (*Leçons sur les fonctions discontinues*) in 1905. However, in his book, we notice the fact that the diagram is divided into two graphs: the first diagram corresponds perfectly to the one proposed in Baire's thesis, but two pages later there is another diagram identical to the first, but it is completed by additional elements in order to fully prove a part of the equivalence between the two previous problems evoked. In his thesis, however, Baire proved that part without using the construction in question. Why did Baire feel the need to add new elements to his original diagram? Why did he include these elements in a separate diagram rather than within the same diagram? Here are some examples of the questions we will address. The presentation will therefore present a study of the evolution of a diagram according to two different temporal axes: either within the same text, with its various modifications, or over a longer period of time, corresponding to Baire's thinking, by comparing the evolution of the diagram in two texts.

Megan Briers (Max Planck Institute for the History of Science; Technische Universität Berlin)

Controversy over Correspondence: Richarda Airy and the Discovery of Neptune

The discovery of Neptune in 1846 is a well-studied episode, with many debates both at the time and in the resulting historical literature over who was responsible for its discovery, and the motivation and loyalty of prominent actors involved. The literature has largely centered around a small group of practitioners, neglecting to consider other actors with important stakes in these debates such as Richarda Airy, the wife of the British Astronomer Royal at the time.

This presentation will explore the ways in which Richarda employed her correspondence to defend George and her family's actions in the Neptune episode. When doubts were expressed about missed opportunities in the run up to the observation of Neptune, Richarda lent on her privileged domestic position to both explain the sequence of events and to emphasise the necessity of family priorities in guiding the actions taken.

By integrating typically considered archive sources with the often-forgotten family collections, I will create a more developed picture of people and spaces important for the British astronomical community in this period, highlighting the centrality of both families and domestic spaces in the Neptune episode.

Elife Çetintas (Bergische Universität Wuppertal)

The Term 'Structure' in Mathematical Discourse from 1889 to 1942: A Bibliometric Study by Using the Jahrbuch über die Fortschritte der Mathematik

This research project explores the historical development of the use of the term 'structure' in mathematical discourse from 1889 to the 1960s, focusing on the *Jahrbuch über die Fortschritte der Mathematik* (*JFM*), which was published in Germany and was the first internationally extensive review journal in the history of mathematics. It contains information on almost all publications in mathematics and its application areas from 1868 to 1942. Inspired by Prof. Dr. Ralf Krömer's lecture on *Elie Cartan et l'usage du terme 'structure' dans le discours mathématique*, the project introduces a quantitative investigation using bibliometrics. Key questions include the origin of the term, its distribution across mathematical subdisciplines, and its meaning when used in this context.

The rise of structural mathematics is reflected in the JFM and can also be seen on a bibliometric level in the context of scientific publications. In my presentation I would like to present the first results of my bibliometric analysis with the *JFM*. The data of the *JFM* is available electronically on the Open Access platform *zbMATH*. There I searched for the term 'structure' in the title or in the review. Keywords are omitted as they were only added to the database later. Furthermore, the different spellings in German (Struktur, Structur), French and English (Structure) and other languages are also taken into account here. The search results were then assigned to the subdisciplines of mathematics to illustrate how the number of subdisciplines in which the term is used is developing and increasing.

Elisa Dalgalarrondo (SPHERE laboratory/Cité du Genre; Université Paris Cité)

The 'Femmes et mathématiques' Seminar at the Université d'Orsay: A Window on Women's Perceptions of Their Place in Mathematics in France (1974)

During the 1970s, in France, several groups led reflections on the role of women in mathematics. These collectives, mainly composed of women, were involved in various structures such as seminars, teachers associations or informal discussion groups. All of these collectives talked about 'women and mathematics'; however they explored different aspects of this theme, from girls' interests towards mathematics to statistics on women at university, from working conditions of women mathematicians to personal experiences.

In this talk, I will focus on one such group, formed on the occasion of a 'critical seminar' called *Mathématiques, mathématiciens et société*. The seminar was organised in 1974 by French mathematician Pierre Samuel (1921–2009) at the Université d'Orsay. Its aim was to reflect on the place of mathematics and mathematicians in society. During two sessions of this seminar, women mathematicians highlighted the experience of being a woman working in mathematics.

Who were the contributors of these sessions? How did they approach the questions raised? What were the different points of view they developed in their talks? How were these discussions situated into a broader context of women's liberation movement? I will explore these questions by combining an analysis of the proceedings of the seminar with some oral history interviews that I conducted. In doing so, I will shed light on the women's points of view on their place and status in mathematics in France in the 1970s.

Andrew Halyburton (University of St Andrews)

The Diffusion of Hindu-Arabic Numerals Throughout Late Medieval Europe

The Hindu-Arabic numerals are a fundamental part of modern-day arithmetic and underpin modern mathematics as a whole. However, it was several centuries after their introduction into Europe that HAN became commonplace, and many popular authors of the last century have attempted to attribute this slow pace to a supposedly backwards-thinking population or an oppressive religious community.

While it can be shown that these claims are unsubstantiated, this still leaves us with the question as to why the Hindu-Arabic Numerals did indeed take so long to become universal. Alternative explanations for the slow transition include natural resistance to change, suitability of the Roman numerals, and access to education. This talk explores these alternative explanations and evaluates their significance compared with the explanations often cited by modern popular authors.

Kate Hindle (University of St Andrews)

D'Arcy Thompson and the History of Mathematics in the Early 20th Century

At the start of the 20th century, the history of mathematics was still a fledgling discipline, with little in the way of institutionalisation. This was the state of the field when D'Arcy Thompson (1860–1948), known as one of the first biomathematicians, took an interest, publishing texts in 1904 and 1929 on the topic of Greek mathematics, and drawing on the history of mathematics in *On Growth and Form* (1917).

In the course of my research on Thompson and his networks, I have spent time investigating this era in the historiography of mathematics, both in a wider sense and in the works of a select group of historians of mathematics with whom Thompson was in correspondence. This talk will discuss this early stage of the history of mathematics, using works from those in Thompson's network to demonstrate the trends, or lack thereof, in approach to the history of mathematics during the early 20th century.

Norbert Schappacher (Université de Strasbourg)

How to Embed Research on the History of 20th-century Mathematics into Historical Epistemology

Historians of mathematics are often caught between working mathematicians, who are eager to learn new stories or pick up ideas for their research, and historians or philosophers of science, who regard mathematics as a curious borderline discipline where, for instance, not even the notion of revolution can be applied without getting into tedious arguments. The aim of the lecture is to propose historical questions and avenues of thought about the history of mathematics in the 20th century that are capable of giving the historian of mathematics greater freedom and render them more interesting for mathematicians and historians/philosophers alike.

By and large, the historical epistemology of the history of mathematics in the 20th century is still today overshadowed by the foundational crisis. This can be a drawback already when it comes to studying the work of Emmy Noether, or Bourbaki. To further open up new perspectives, two examples will be sketched that have profoundly changed a number of mathematical disciplines over the 20th century: cohomological methods, and the theory of moduli spaces.

Petra Stanković (University of Oxford)

Russian Mathematicians at the Serbian Academy of Arts and Sciences Post World War I

After the October Revolution of 1917, many Russian scientists moved abroad due to political and social changes, influenced by Marxism and scientific materialism. Some Russian mathematicians emigrated to Yugoslavia, drawn by cultural and religious similarities, where they contributed to the development of domestic mathematical traditions. This discussion focuses on two prominent mathematical figures in Belgrade: Anton Bilimovich (1879–1970) and Nikolay Saltykov (1866–1961).

One tentative answer I would like to give based on the work I have already done is how these mathematicians, as already established scientists, participated in the International Congresses of Mathematicians (ICMs). Notably, Saltykov served as a Russian delegate prior to joining the Russian Academic Group in Yugoslavia. Beyond scientific objectives, were there other factors influencing their presence at these congresses? Furthermore, did the scientific and institutional goals of the ICMs shape the broader networks and collaborations they pursued?

Drawing on conference proceedings and personal narratives, I explore the dual forces of scientific curiosity and fostering personal relations, that served as their motivation for attendance. Particular attention is given to the role of networking at these congresses, where encounters with leading global scientists often facilitated subsequent collaborations. For example, Einar Hille (1894–1980), Alfred Tarski (1901–1983), and P. S. Alexandrov (1896–1982), active participants in the 1954 ICM in Amsterdam alongside Saltykov, later delivered a series of lectures in Serbia during the post-World War II decade. These interactions underscore the scientific and institutional contributions of Saltykov and Bilimovich to the development of mathematics in Yugoslavia.

David Thorsteinsson (University of St Andrews)

Quantity, Culture, and Cognition: The Role of Agriculture in Shaping Numerical Concepts

Motivated by the limited numbering system of the Pirahã language, this talk explores the possibility that the concept of exact quantity is not a linguistic universal but rather emerges as a cultural innovation driven by practical needs, particularly agriculture. Drawing on evidence from historical linguistics, we examine the number systems of three ancient reconstructed languages: Proto-Indo-European (PIE), Proto-Afroasiatic (PAA), and Proto-Uralic (PU). By comparing these against Pirahã, which notably lacks any exact number words, we see varying degrees of numerical system development that seem to correlate with agricultural practices. PIE, spoken by an agricultural society, conclusively shows a well-established base-10 system, while reconstructions of PAA and PU exhibit more limited or inconsistent number systems. This pattern suggests that sophisticated numerical concepts could have emerged as cognitive technologies in response to changing practical needs rather than being innate linguistic features — though the correlation between agricultural practices and linguistic formalisation of quantitative reasoning remains an open question given the limited data available from pre-agricultural languages.

Jason Yip (Middlesex University) **and Tom Briggs**

Using History as a Pedagogical Tool for Enhancing Affective Development and Academic Performance in Year 7 and 8 Mathematics Classrooms

This research explores the pedagogical potential of incorporating themes from the history of mathematics into early secondary mathematics education. Conducted at a Secondary School in Milton Keynes, it examines the effect of historical perspectives on students' affective domains — including motivation, attitude, and anxiety — and academic achievement.

Jason, a PhD candidate from Middlesex University, and Tom, a mathematics teacher at the school, co-produced and team-taught a half-term's worth of lessons to two mixed-ability classes: one in year 7, one in year 8. Lessons followed the department's standard scheme of work; the only difference was that the researchers explicitly incorporated topic-relevant historical content into each lesson. The endeavour aimed to create a more dynamic learning environment, demonstrating the interconnectedness of mathematics with human activities and reflecting students' life experiences. The study also sought to enrich moral education by presenting mathematics as a collective achievement of diverse cultures and civilisations, fostering a broader appreciation of the subject.

The experiment spanned the first academic term of 2024/25, employing mixed-methods approaches to data collection including surveys, assessments, and ethnographic observations. Their analysis will help determine the extent to which historical content enhances students' emotional engagement and academic attainment.

Ultimately, this research will contribute to the emerging field of the history and pedagogy of mathematics, offering insights into how historical narratives can transform mathematics education. If successful, this approach may serve as a model for integrating history not only into mathematics classrooms but also into other STEM disciplines, enriching affective and cognitive dimensions of student learning.

Posters

Clément Bonvoisin (SPHERE Laboratory; Université Paris Cité)

From Mathematicians' Memories to Historiography? Cold War and the Shaping of Narratives on Pontryagin's Maximum Principle (1948–1977)

Salomé Chauvet (École polytechnique; Université Lyon 1)

Finite Groups in France at the Turn of the 19th Century: An Inquiry on the Determination of all Groups of Small Order

Takaaki Iwai and Alisa Senses (University of St Andrews)

Mathematical Influence of Fedor Baranov in the Soviet Union and Beyond

Priyamvada Nambrath (University of Pennsylvania)

Deciphering Vernacular Mathematics: Going Local in a Sanskritic World

Version of 21 January 2025