

# IMS DISTINGUISHED VISITOR LECTURE SERIES

## Date, time and venue

3 January 2023 (Tuesday)  
9.30–10.30am, GMT +8 (Singapore Time)  
IMS Auditorium  
3 Prince George's Park, Singapore 118402

## Unipotent Character Sheaves and Strata of a Reductive Group

George Lusztig

Let  $G$  be a connected reductive group over an algebraically closed field. There are two interesting finite sets associated to  $G$ . One, denoted by  $CS(G)$ , is the set of unipotent character sheaves on  $G$ ; these are certain simple perverse sheaves on  $G$  which are useful for computing characters of irreducible representations of finite reductive groups. The other, denoted by  $St(G)$ , is the indexing set of a partition of  $G$  into strata, each of which is a union of conjugacy classes of fixed dimension. It turns out that there is a natural surjective map from  $CS(G)$  to  $St(G)$ . It is defined using Springer correspondence in bad characteristic.

## Colloquium talk

Jointly organized with Department of Mathematics, NUS

## Date, time and venue

6 January 2023 (Friday)  
2–3pm, GMT +8 (Singapore Time)  
Lecture Theatre 34  
National University of Singapore (Kent Ridge Campus)  
10 Kent Ridge Crescent, Singapore 119260

## Semisimple Groups and the Theory of Total Positivity

George Lusztig

According to Chevalley, semisimple groups can be defined over any field. More recently they were defined over some structures called semifields (which include the set of strictly positive real numbers under the usual addition and multiplication). It turns out that the theory over semifields can be used to get a better understanding of the theory over fields.



Professor George Lusztig  
MIT, USA

George Lusztig is the Abdun-Nur Professor of Mathematics at MIT. He joined the MIT mathematics faculty in 1978 following a professorship appointment at the University of Warwick, 1974–77. He was appointed Norbert Wiener Professor at MIT 1999–2009.

Professor Lusztig received his Ph.D. from Princeton University, and works on geometric representation theory and algebraic groups. His awards include the Berwick Prize of the London Mathematical Society (1977), the AMS Cole Prize in Algebra (1985), and the Brouwer Medal of the Dutch Mathematical Society (1999), the AMS Leroy P. Steele Prize for Lifetime Achievement (2008), the Shaw Prize in 2014 and the Wolf Prize in Mathematics (2022). Professor Lusztig is a Fellow of the Royal Society (1983), Fellow of the American Academy of Arts & Sciences (1991), and Member of the National Academy of Sciences (1992).

The talk is part of the program on *Representation Theory, Combinatorics and Geometry* (12 December 2022–7 January 2023)

Program webpage

<https://tinyurl.com/RepTheoryDec2022>

Registration

<https://tinyurl.com/IMSRepTheoReg>

