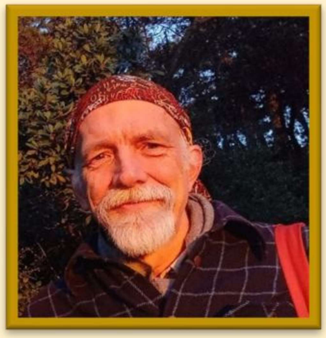
**Oman Mathematics Committee Weekly Research Webinar- OMC-WRW**
**Fall 2025 – Spring 2026**
**Season 2 (S2 – #15)**

**Date**: Wednesday 22/4/2026
**Time**: 20:00 Muscat meantime (GMT +4)



## Speaker: Prof. David Pierce, Mimar Sinan Fine Arts University, Istanbul, Turkey

**Biography:** David Austin Pierce read Euclid, Apollonius, and Descartes as an undergraduate at St John's College, Santa Fe, New Mexico, USA. He earned a doctorate in pure mathematics at the University of Maryland, College Park, in 1997, specializing in mathematical logic and model theory. He held postdoctoral fellowships at the University of Illinois, Urbana-Champaign; the Mathematical Sciences Research Institute, Berkeley; and McMaster University, Ontario, Canada. In 2000, he joined his spouse, the group theorist Ayşe Berkman, in the mathematics department of Middle East Technical University in Ankara, Turkey. The two of them moved to Mimar Sinan Güzel Sanatlar Üniversitesi in Istanbul in 2011. David Pierce became a full professor in 2013. His publications concern not only model theory and logic, but geometry and the history and philosophy of mathematics. He has also written lecture notes in various subjects, in English and Turkish.

## Title: A Geometry of Points and Polygons

**Abstract**: In La Géométrie of 1637, René Descartes gives a geometrical foundation for algebra by interpreting a field in a Euclidean plane. At least, that is what we can understand him as doing, but his work has gaps. These are filled in different ways by David Hilbert (1862--1943), Alfred Tarski (1901--83), and Emil Artin (1898--1962). Tarski's plane is explicitly just a set of points, with a ternary relation of betweenness and a quaternary relation of equidistance, satisfying certain axioms, written in first-order logic (that is, each axiom is finite, with quantification over individuals only). Artin does not use the quaternary relation, but the elements of his field are algebraic, in the sense of being operations on the set of points. We can make the field elements more purely geometric by understanding them as equivalence classes of ordered triples of collinear points. The equivalence relation is proportional division. Artin's axioms include versions of theorems named for Desargues (1591--1661) and Pappus (4th century). That Desargues's Theorem follows from Pappus's Theorem is shown by Hessenberg (1874--1925). Moreover, Pappus proves his theorem by means of Book I alone of the *Elements* of Euclid, without any notion of proportion. The theory of area is needed: in particular, that triangles on the same base are equal, if and only if the line joining their apices is parallel to the base. In a two-sorted structure then, with points and areas, we can axiomatize a plane in which a field is interpreted. This approach is of interest, both for providing a new example of the model-theoretic concept of a companionable theory, and because many results of Greek mathematics, notably those of Apollonius on conic sections, rely essentially on areas. The proofs do not readily translate into the formalism of Descartes, in which the constants and variables are only for lengths. Descartes's solution of a five-line locus problem does not require areas. Neither does it require his formalism, but it can be proved, perhaps more clearly, in the ancient manner.

## Moderator: Mohammad Shahryari, Sultan Qaboos University – Oman