



Calendar details

Date:	Tuesday, 20 April 2021
Time:	04:00 pm – 06:00 pm (Melbourne, Australia)
Event Registration Link:	https://www.eventbrite.com.au/e/australian-society-of-rheology-seminar-20-april-2021-registration-147105970919

Invited lecture

Professor Dimitris Vlassopoulos

(Foundation for Research and Technology Hellas (FORTH) and University of Crete)

Rheology Modification of Physical Networks: Topology and Competing Interactions

Tailoring the rheological properties of soft composites has been a thematic at the forefront of engineering research for long, with important contributions in the field of mechanical reinforcement. One challenge is understanding the fundamental role of topological constraints and in particular altering network dynamics without, say, the creation of hybrid material such as nanocomposite. To this end, emphasis is placed on the study of network dynamics through the formation and exchange of entanglement-like constraints. This can be achieved in different ways, and here we address two specific examples: (i) homopolymer mixtures of different architecture (notably linear, star and ring polymers), where topological interactions are predominant; and (ii) supramolecular assemblies based on same different units with the same associating motif (hydrogen bonding or solvophobicity), which are characterized by competing interactions. Our extended linear and nonlinear rheometric investigations, complemented by structural evidence and simulations, reveal interesting new phenomena such as non-monotonic dependence of modulus on composition and enhanced nonlinear elasticity. The punchline is the emerging ability to selectively tailor the rheological properties of a wide range of synthetic and supramolecular polymers at molecular level.



Speaker's biography



Diploma, Chemical Engineering, NTU Athens, 1983; PhD, Chemical Engineering, Princeton University, 1990. Mobil R&D (1990-1992), FORTH (1992-), University of Crete, Materials Science & Technology (2002-). Weissenberg Award, ESR (2015), Bingham Medal, SOR (2019), Fellow, SOR (2018), APS (2019). European Editor, *Rheologica Acta* (2006-2011); Associate Editor *Soft Matter* (2015-). Published 217 papers, 85 invited lectures in conferences and 118 seminars in Universities/Research Centers. The underlying research theme is the molecular engineering of soft matter by

devising strategies based on the design of model systems with adaptable molar mass and macromolecular architecture or tunable interactions, coupling thermodynamics with rheology and bridging the gap between polymers and colloids. This approach has revealed microscopic insights into the rheology of homogenous and heterogeneous polymers, colloids of varying softness and fluid interfaces. Current topics include rheometry, associating soft colloids, yielding transitions in soft colloidal mixtures, ring polymers, supramolecular assemblies, nonlinear rheology of unentangled polymers, thick polymers, double interpenetrating networks.

Enquiries may be directed to Dr Ellie Hajizadeh, ellie.hajizadeh@unimelb.edu.au