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Key words: Soft matter, rheology, simulation

Research Interests: Hierarchical modelling of entangled polymer dynamics; Dyamics of nonlinear polymer architectures, especially ring polymers; Fast flows of dense entangled polymer liquids; Sturcture and macroscopic properties of polymer gels; Self-organisation in Amphiphiles; Quantification of branched structures etc.

PR: Soft matter systems are ubiquitous and have many intriguing properties. As thermal fluctuations play an important role in the behaviour of these systems, they often display disproportionately large response under modest external perturbations. This allows for extensive tuning of the sturcture and properties of these systems. Soft materials include polymers (both natural and synthetic), colloids, liquids, gels, liquid crystals etc. and most biological materials can be classified as soft.

I joined the tenure-track program in June 2010 and am currently building my research group. The focus of our group is on flow phenomena in soft matter with an emphasis on polymeric materials. We extensively use computer simulations to model flow behavior. The work has direct relevance for understanding polymer processing in the industry and for solving problems encountered during the manufacture of polymer products. In fact, some of the problems we study are directly motivated by questions and comments from our colleagues in the industry! The research could also be helpful in devising new manufacturing processes, say for instance, for cutting-edge functional organic devices using the novel materials created by my colleagues here in Yonezawa. Another aspect of our work is the potential to leverage our knowledge of phenomena in soft matter to understand phenomena of biological importance. Please feel free to contact me at the email address above if you would have any questions or for further discussion.