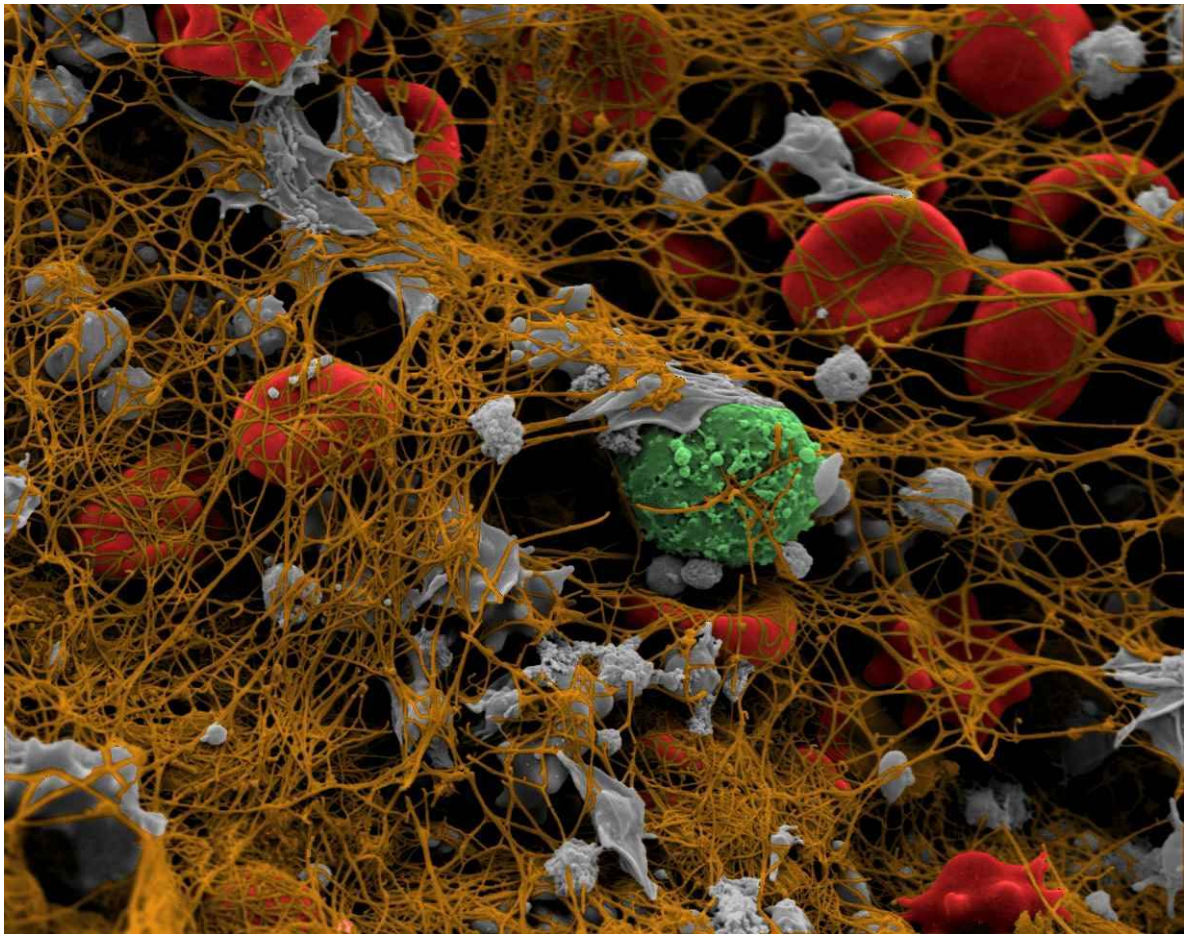
Speaker: Andre Brown, Clare College, Cambridge, UK
Title: Mechanics of fibrin from single molecules to blood clots

Abstract: There is increasing interest in understanding what gives rise to the fascinating mechanical properties of biological materials and how cells and organisms sense and respond to these properties. I will discuss work on the mechanics of networks made of the protein fibrin, the principal structural component of blood clots, which must be both strong to stop blood flow and stretchy to survive in dynamic environments. In fact, blood clots are among the most extensible protein materials, but the origin of this extensibility is not understood. Furthermore, blood clots must be highly porous so that they can be broken down efficiently by enzymes when they are no longer needed. How clots balance the requirements of stiff fibres that provide large pores with extreme extensibility is a central question. We took a multi-scale approach ranging from single molecules to whole clots and suggest that it is the unfolding of the proteins that make up the clot scaffold that allows them to be stiff when relaxed and to stretch so far when stressed.