Good old polymers such as polyolefin and polydiene are playing the major role in our modern civilization. Over past century, polymer scientists and engineers have successfully developed technologies for production and processing of these commodity polymers with desired chemical structures such as composition, molecular weight and distribution, sequence distribution and stereochemistry, chain architectures such as short or long chain branching and block copolymers. In this talk, we extend our scope beyond “static” chemical structures, and to investigate the effect of “dynamic” structures of prepared polymers such as disentangled UHMWPE. Also to be presented is our recent work on place all diblock copolymer molecules at the interface of a binary blend by asymmetric molecular design and sequential mixing to remarkably improve crack resistance and other mechanical properties, and using theories and experiments to understand the migration pathways of these macromolecules.

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Biographical Sketch: Dr. Zhong-Ren Chen earned his B.S. and M.S. in Chemical Engineering at Zhejiang University in Hangzhou, China, and his M.S. in 1995 and Ph.D. in 1998 in Chemical Engineering and Chemistry under the supervision by Prof. Julia A. Kornfield and 2005 Nobel laureate Prof. Robert H. Grubbs at the California Institute of Technology. He then moved to the Chemistry department at Stanford University with Prof. Robert M. Waymouth and with Honeywell Electronics as postdoctoral fellow. His industrial experience also includes over 10 years of R&D with Bridgestone Americas in Akron, Ohio. In 2011, after being recruited as the “1000 talent plan” program of China, he went back to hometown and joined Ningbo University as the dean of materials science and chemical engineering, and inaugurated polymer programs there.

His research interest is to harvest desired structures of polymers for optimal properties by various chemical, physical, and engineering approaches, with focus on “old” olefin and diene monomers and “commodity” polymers. Projects in Zhong-Ren Chen’s group are interdisciplinary, creating synergies among organometallic and polymer chemistry, polymer physics and rheology, polymer reaction engineering, self-assembly and multi-scale processing, interfacial science and adhesion, as well as failure mechanism and crack propagation of soft materials and composites.