Joint Center for Soft Matter and Biological Physics

and Condensed Matter Seminar

Prof. Qi-Huo Wei

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"Printing Molecular Orientations as You Wish"

Date/Time: *Monday, 21 October 2019,*

4:00pm -5:00pm

Location: *304 Robeson Hall*

Abstract: Liquid crystals consisting of rod-shaped molecules are a remarkable soft matter with extraordinary responsivity to external stimuli. Techniques to control molecular orientations are essential in both making and operating liquid crystal devices that have changed our daily lives completely. Traditional display devices are based on uniform alignments of molecules at substrate surfaces. In this talk, I will present a new photopatterning approach for aligning molecules into complex 2D and 3D orientations with sub-micron resolutions. This approach relies on so-called plasmonic metamasks to generate designer polarization direction patterns and photoalignments. I will present the basic principles behind this approach and a number of intriguing applications enabled by it, including micro-optical devices for laser beam shaping, commanding chaotic motions of bacteria, and creating topological defects with designer structures.

Qi-Huo Wei studied in the Physics Department at Nanjing University and got his PhD in condensed matter physics in 1993. He is currently a professor at the Advanced Material and Liquid Crystal Institute in Kent State University, USA. He made original contributions to the basic understanding of a diverse set of topics, including single-file diffusion, plasmonic coupling in nanoparticles, Brownian motion of low symmetry colloids, and photoalignment patterning of molecular orientations. He was an Alexander von Humboldt research fellow between 1996 and 1999 at University of Konstanz in Germany, and a recipient of the NSF CAREER award in 2011. His current research interest covers liquid crystal physics and material engineering, soft and active matter, biomimetics, 3D/4D printing.