NORTHWESTERN UNIVERSITY'S DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING AND MATERIALS RESEARCH SCIENCE AND ENGINEERING CENTER PRESENT:

2022 MSE FUTURE LEADERS SEMINAR SERIES

Antonio Tavera-Vazquez

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Antonio was born in Morelia, Mexico. He obtained his BS degree in physics and mathematics from the University of Michoacán. After that, he moved to Mexico City and got his MS degree in physics in 2014 at the Institute of Physics from the National University of Mexico. At the same place, he pursued a Ph.D. degree in physics focused on the experimental study of mechanical and dynamical responses of thread-like morphologies in complex fluids by rheology, microrheology with dynamic light multi-scattering, and static scattering techniques. In January 2019, Antonio earned his Ph.D. degree with honors. Right after, he joined Professor Juan de Pablo's group at the University of Chicago, where he currently conducts experimental research in liquid crystals, with focused attention activating micro-particles triggered by light within thermotropic liquid crystals. Antonio has also participated in different educational and outreach programs, as training students for the Physics Olympiads, science fairs, and more recently in "Clubes de Ciencia" in a collaborative effort between Mexican and US institutions.

Tunable and activated soft materials with anisotropic morphologies

Designing self-assembled materials has become crucial to the material sciences for engineering novel technologies. This can be achieved by either tuning their rheological properties or activating their dynamical mechanisms using external fields. Candidates for these materials are complex fluids, formed by different anisotropic structures exhibiting diverse length scales, widely found in nature or synthetically created. Furthermore, some of these materials organize displaying liquid crystalline mesophases with temperature and concentration dependence. In this seminar, I will give an overview of recent research on some complex fluids with embedded thread-like morphologies, experimentally studied by mechanical rheology and light scattering techniques with tunable mechanical properties, as worm-like micelles made of amphiphilic building blocks and carbon nanotubes composites within polyelectrolytes. In the end, I will show an example of a quasi-2D active system consisting of solid micron-sized platelets immersed in a thermotropic nematic liquid crystal that self-propels in the presence of light. Potential applications of these sorts of materials can be found in the food and medical industry, water filtration technologies, and as composites for electronic devices.

Thursday, June 16 • 10 AM CDT • Zoom Link

Meeting ID: 958 6172 3631 • Password: mse_FLS

Questions? Contact Elena.Lindstrom@northwestern.edu

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