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Title: **Applying Soft Materials to Real World Problems.**

The Complex Assemblies of Soft Matter Lab (COMPASS UMI 3254) is a unique collaboration between the CNRS, Rhodia and the University of Pennsylvania. The COMPASS lab is a team of scientists with differentiating capabilities in the creation, manipulation and understanding of soft materials. The team is dedicated to finding sustainable innovative solutions to real world problems. The three main themes of the lab are water scarcity, energy storage and transfer, and sustainable formulations. In this talk, an overview of the activities will be presented.

1) Water Scarcity: The goal of this project is to increase the amount water available to roots of crops and reduce overall water consumption. Studies will be presented on flow in fragile porous media, clogging mechanisms and root growth in the presence of drainage and evaporation.

2) Energy Transfer and Storage: Studies will be presented on new formulations based on organic components that are good candidates for the replacement of Indium Tin Oxide. In addition, studies will be presented on catalytic inks for the reduction of platinum in fuel cell devices.

3) Sustainable Formulations: Studies will be presented based on a unique novel system, temperature sensitive microgels. These microgels are used to understand jamming and melting behavior in real time. This model system allows us to better understand space filling mechanisms in formulations with the goal of achieving equal performance with the minimum amount of raw materials.