Scientists revealed how a network of nanoparticles tightly bonded by polymer bridges controls the mechanical properties of polymer nanocomposites (PNCs).

Significance and Impact
Understanding the microscopic structural and dynamical features of the bridge network in polymers, and how they relate to the polymer’s behavior, e.g., its toughness, can help guide polymer design for future applications such as tires and wind turbine blades.

Research Details
- Used the CHX and CMS beamlines at NSLS-II to study the structure and dynamics of the network-like structure of PNCs.
- Used the dynamical mode-coupling theory to understand the observed NP dynamics.
- Used mechanical tests at the CFN to establish the structure-dynamics-property relationship.


Work was performed in part at Brookhaven National Laboratory.