Title: Improving plant by manipulating plant cell wall

As a researcher in Great Lakes Bioenergy Research Center (GLBRC), I have been doing the basic research that generates technology to convert cellulosic biomass into ethanol and other advanced biofuels. Developing plants with traits that increase the value of the crop as a biofuel feedstock by manipulating plant cell wall is one path to achieving the goal. Plant cell wall consists of cellulose, hemicellulose, pectin and lignin. Each component of plant cell wall has important roles during plant growth by modulating cell expansion, providing mechanical support and barriers. I have researched hemicellulose, which is comprised of a variety of sugar. Certain types of polysaccharides, such as mixed-linkage glucan (MLG), are easier to convert to ethanol than others due to its simple composition and digestibility, so I have been studying how MLG is made and transported in the plant, with the goal of increasing the overall amount of MLG, without agronomic penalties, in biofuel crops like sorghum.

Besides MLG, pectin is also one of important cell wall components in plant, which is essential for plant growth and development. By generating plants overexpressing or lacking specific genes in pectin synthesis and modification, we were able to demonstrate that manipulating pectin could impact plant growth and cell wall property that can favorably affect plant quality and quantity as a biofuel feedstock.