Brown rot fungi are efficient carbon source converters in terrestrial system, and their mechanisms for deconstructing lignocellulose offer pathways with industrial relevance. These fungi can be found in multiple Agaricomycotina linages, which convergently evolved the common ability to selectively metabolize carbohydrates of wood (carbohydrate selective; lignin-rich residues). Comparative genomics have revealed that brown rot fungi lost ~50-60% functional CAZY genes that were developed in their white rot relatives (simultaneously decay; lignin-poor residues). This in contrast resulted in an enhanced wood-decomposing capacity in brown rot, indicating an updated system that may have been developed in them. Using newly arisen system biology approaches, we are uncovering the genetic mechanisms that underline this brown rot adaptation. We proposed a novel brown rot “two-step” genetic mechanism that has been adopted widely by fungi to rewire the genetic elements to selectively extract carbohydrates in a highly efficient way. This “brown rot model” is being validated from different angles by us and other international groups, providing novel views for developing next generation biofuels and bioproducts.

Jiwei Zhang, PhD, is currently working as a Research Associate in Dr. Jonathan Schilling’s group at Department of Plant and Microbial Biology at University of Minnesota. His work focuses on genetic mechanisms of wood decomposition in wood-decaying fungi. He and colleagues recently proposed a “two-step” brown rot model, which has sent ripples of excitement into the wood decaying research community. This work also provided new insights to the development of sustainable bioproducts and biofuels.

If you cannot attend the lecture please join us online. You can find the link to watch this seminar online and turn in an evaluation at https://z.umn.edu/candidateseminars