**Friday, September 28, 2018**
**11:15-11:45 a.m.**

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## Competition, coevolution, and managing indigenous soil microbiomes to optimize disease suppression

Microbes and plants exist within complex networks of interacting plant and microbial species. Our work explores the roles of plant community diversity, plant host, and fungal and bacterial species interactions in determining the pathogen-suppressive potential and composition of soil microbiomes, and the consequences for plant productivity. We show that rhizosphere *Streptomyces* associated with the same plant host are significantly more pathogen-suppressive when the host grew in monoculture vs. a high-diversity plant community. In contrast, populations of *Streptomyces* in the rhizosphere of plant hosts growing in high-diversity communities are more niche-differentiated than populations associated with the same host in monoculture. These data suggest that plant diversity plays a critical role in determining the likelihood of antagonistic arms race coevolution vs. niche differentiation among sympatric soil populations, with significant implications for plant disease suppression. Across kingdoms, *Fusarium* are likewise significantly better at inhibiting sympatric than allopatric populations of *Streptomyces*, and inhibition is positively correlated with niche overlap between sympatric, but not allopatric**,** populations**.** This work illustrates how diffuse networks of species interactions over diverse spatial scales contribute to determining the antagonistic potential of indigenous soil microbes, and suggests specific crop management approaches targeting coevolutionary species interactions offer potential for sustainable disease control.