# QUANTITATIVE AND SYSTEMS BIOLOGY COLLOQUIUM:
# Characterization of phage-mediated plant-microbe interactions in the rhizosphere


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## About The Speaker:

Jonelle Tamara Basso is a research scientist at the DOE Joint Genome Institute focusing on plant-microbe interactions. Her research investigates the quantitative impact of phage genes on root colonization and the molecular underpinnings of a presumptive plant-bacterial-phage interaction.

## Abstract:


The plant microbiome includes beneficial microbiota that provide the plant protection, increased nutrient availability and stress resilience. While previous and ongoing studies of the rhizosphere microbiome have been critical for assessing the impact of specific plant-microbe interactions, their focus has overwhelmingly targeted bacterial and fungal members of the microbiome. Viruses are ubiquitous, outnumbering all other biological entities on the planet, yet they are remarkably understudied in the rhizosphere. Prior transposon-sequencing data analysis conducted in our group identified functional roles for hundreds of genes in the plant growth promoting rhizobacterium Pseudomonas simiae WCS417 that are important for its colonization of the rhizosphere. Two of these genes that cause reduced fitness in the rhizosphere when mutated are components of a latent bacteriophage and are present among two phage loci ranging in size from 15-65kbp. To better understand this phenomenon, we used a loss of function approach to generate fluorescently-labeled phage gene deletion mutants and subsequently conducted experimental characterization studies such as root colonization assays and phenotypic comparative assessments. We observed no significant difference in growth dynamics between mutants and wildtype. We identified clear changes in metabolic profile between no bacteria controls and bacteria treatments from pilot in vivo targeted metabolomics experiments conducted in liquid growth media. Taken together, these findings suggest the possibility that resident bacteriophages are involved in modulating the ability of bacteria to colonize plants, as well as how their bacterial hosts use metabolites generated from root exudates. The molecular underpinnings of this presumptive plant-bacterial-phage interaction are currently being investigated.


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