



# BIOINFORMATICS SEMINAR

## STEPHEN SMITH

*Graduate Student, UNIVERSITY OF DELAWARE*

### SPATIOTEMPORAL ROOT MAP IN SHADE

Plants are subject to many stressors that are both biotic and abiotic. These stresses are often overcome by the plants ability to perceive a signal and respond via biological changes. In our research, the plant's response to shade is known to be triggered by altering the Far Red to Red light ratio under controlled conditions. The genes and pathways for this response are not well studied within roots. A differential gene expression of the conditions has previously been performed using RNA seq showing some genes. In this case, we use single cell sequencing to differentiate cell types before performing the differential gene expression. By further elucidating the differentially expressed genes within a tissue type at specific times, we were able to extract candidate genes for further study of this response. What is significant is the genes from the RNA seq experiment were not able to identify the same genes from scRNA seq showing that we were able to attain a finer resolution spatiotemporal root map to the shade response.

### BIOGRAPHY

Stephen earned his undergraduate degree in Biology from UD in 2016 and is currently a Bioinformatics Masters student working in Dr. Erin Sparks' lab. Prior to that, he graduated from Naval Nuclear Power School in 2005 and remained a reactor electrician until 2010. From 2010-2019 he was an educational lab tech from, a bioinformatics/microbiologist intern, a laboratory technician in infectious diseases and a staff scientist in genome sequence analysis.

## CBCB SEMINAR

**2/14/2022**

**3:30-4:30PM**

**\*NOTE: seminar will be held virtually this week:**

via ZOOM:

<https://udel.zoom.us/j/93068494454>

**(Passcode: BINF)**

[bioinformatics.udel.edu](http://bioinformatics.udel.edu)

# ASHLEY HOSTETLER

*Postdoctoral Research Scientist, UNIVERSITY OF DELAWARE*

### BRACING FOR SUSTAINABLE AGRICULTURE: MULTIPLE BRACE ROOT PHENOTYPES PROMOTE ANCHORAGE AND LIMIT ROOT LODGING IN MAIZE

Plant mechanical failure (lodging) causes global yield losses of 7-66% in cereal crops. We have previously shown that the above-ground nodal roots (brace roots) in maize are critical for anchorage. However, it is unknown how brace root phenotypes vary across genotypes and the functional consequence of this variation. This study quantifies the contribution of brace roots to anchorage, brace root traits, plant height, and root lodging susceptibility in 52 maize inbred lines. We show that the contribution of brace roots to anchorage and root lodging susceptibility varies among genotypes and this contribution can be explained by plant architectural variation. Additionally, supervised machine learning models were developed and show that multiple plant architectural phenotypes can predict the contribution of brace roots to anchorage and root lodging susceptibility. Together these data define the plant architectures that are important in lodging resistance and show that the contribution of brace roots to anchorage is a good proxy for root lodging susceptibility.

### BIOGRAPHY

Dr. Ashley Hostetler received her Ph.D. in Biology from West Virginia University in 2020 while working with Dr. Jennifer Hawkins. Dr. Hostetler's dissertation work focused on identifying the morphological, physiological, and genetic mechanisms of salinity tolerance within *Sorghum*. In June of 2020, She joined Dr. Erin Sparks' lab where she began focusing on the characterization of brace root development and function within *Sorghum* and *Zea mays*.