



Daniel was born in Harlingen, TX. He received his B.S. in Biological and Agricultural Engineering from Texas A&M University in 2010.

He is currently a M.S.E. candidate, under the supervision of Dr. Patrick Murphy. During his studies, machine systems and agricultural mechanization have been his primary research area.

His M.S. research focuses on mechanization of *Miscanthus giganteus* establishment. This involves developing a precision rhizome planter and rhizome harvester for miscanthus.



# Agricultural & Biological ENGINEERING

## Thesis Defense

<b>Speaker:</b>	<b>Daniel Galle</b>
<b>Title:</b>	<b>Development of an Automated Precision Planter for Establishment of <i>Miscanthus giganteus</i></b>
<b>Major Professor(s):</b>	<b>Dr. Patrick Murphy</b>
<b>Date:</b>	<b>Wednesday, February 29, 2012</b>
<b>Time:</b>	<b>1:00 PM</b>
<b>Location:</b>	<b>ABE 212</b>

### Abstract:

*Miscanthus giganteus* is a seed sterile crop that has shown potential in the US and Europe as a bioenergy crop. Due to its sterility, *M. giganteus* is principally propagated by rhizome division. However, limited research has been conducted on the mechanization of the propagation system. Vegetatively propagated crops, planting procedures and commercially available production equipment were reviewed to gain perspective on how to potentially mechanize the process of planting *M. giganteus* rhizomes. Typical procedures and equipment used for rhizome harvesting were also examined. The review of available technology shows that there are aspects of horticultural equipment that are adaptable for use with *M. giganteus*. In addition, examination of specialty equipment for *M. giganteus* shows aspects that are improvable such as uniformity of spacing in row and rhizome singulation. Current equipment for propagation of rhizomes relies on bulk metering of rhizomes into furrows, the key disadvantage of which is non-uniform spacing. Based upon the review and recommendations that were developed, a prototype precision miscanthus rhizome planter was developed from Lockwood Air Cup® row units. The prototype planter successfully demonstrated that precision planting of miscanthus rhizomes is possible.

### Application:

The results of this research show that a precision rhizome planter can be developed for *Miscanthus giganteus* rhizomes. This research can be further expanding to other miscanthus species such as *Miscanthus sinensis*, which is difficult to establish by seed. The greatest impact of this research is that it may help reduce production costs of *Miscanthus giganteus*, a promising biomass crop for the US.