# Phenotype Screening
## CORPORATION
*enabling discovery*

## 2016 Hot Topic Workshop : 1st Announcement
### Small-Sample-Size Statistics in Agriculture; How to Maximize Business Value

## Workshop Description

This one-day workshop brings the latest in statistically based decision support methods to the crop protection and crop enhancement community, allowing them to learn more about small sample size statistics, its achievements and its limitations. This includes important issues related to small-sample-size experimental design, data analysis, data interpretations, limitations of "p-value," and alternatives to frequentist's statistics as they pertain to supporting business decisions in agriculture product development and new product introduction. Leading academic experts will provide a firm theoretical foundation while leading industrial decision makers will give their perspectives on how statistics is used within their larger decision support framework.



*Workshop Title*: **Small-Sample-Size Statistics in Agriculture; How to Maximize Business Value**

*Date*: **November 3, 2016 (Thursday)**
 **8:00 a.m.—5:00 p.m.**

*Location*: **University of Tennessee Conference Center, Knoxville, TN**

*Conference Hotel*: **Knoxville Hilton**

*Registration Fee*: **Registration is free**

**To register for the workshop click here:**

https://utconferences.outreach.utk.edu/ei/getdemo.ei?id=508&s=_1I40WH8RC&bulk=y

A block of rooms has been reserved at a rate of $159/night.

To register for a hotel room click here:

www.knoxville.hilton.com

At the top of the Knoxville Hilton page enter arrival date, departure date, number of rooms, etc., then click "Add special rate codes" enter **PHEN** in the Group Code box. Then click "Check Rooms & Rates" and proceed with reservations.

## Motivation

Statistics has been in the news a lot lately and it hasn't been pretty. The American Statistical Association issued a first of its kind warning to the scientific community earlier this month on the misuse of the p-value. "Scientific conclusions and business or policy decisions should not be based only on whether a p-value passes a specific threshold."[1]

The Open Science Collaboration, an effort to reproduce 100 influential peer–reviewed studies with significant results (p<.05), found only 36% of the replications had significant results.[2]

It has been estimated that nearly 50% of published scientific articles have at least one statistical error.[3]

These controversies have been brewing for a while. ScienceNews (Siegfried, 2010) wrote: "It's science's dirtiest secret: The 'scientific method' of testing hypotheses by statistical analysis stands on a flimsy foundation."

(1) Statisticians issue warning over misuse of P values, Nature, Volume:531, 151 (10 March 2016) doi:10.1038/nature.2016.19503

(2) Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. Science, 349 (6251), aac4716. Doi: 10.1126/science.aac4716

(3) Normality Tests for Statistical Analysis: Guide for Non-Statisticians, Int. J. Endocrinol Metab. 2012; 10 (2):486-489. DOI:10.5812/ijem3505

(continued)

## Speakers and Topics

*We have worked with leading commercial and academic experts in the field to pull together an outstanding agenda and slate of presenters.*

*Professor Vasileios Maroulas, The University of Tennessee, Department of Business Analytics and Statistics, will give the "foundations lecture" reviewing the fundamentals of inferential statistics within the context of small sample size experiments and decision making.*

*Dr. Ronald Wasserstein, Executive Director, American Statistical Association, is our Keynote speaker and will review the context for and reaction to the ASA's recent warning on the misuse of the "p-value" in science and business.*

*Stephan Conrady, Managing Partner, BayesiaLab USA will present on transitioning from statistical inference to probabilistic reasoning within the context of small sample size data.*

*Professor Edzard Santen, University of Florida Department of Agronomy, will review common mistakes in small sample size biological experiments and advise on how to avoid them.*

*Dr. Kater Hake, Vice president Agriculture & Environmental Research, Cotton Inc. will present on the perspective of commodity growers (pulling together inputs from maize, soybean, wheat, sorghum and cotton commodity research organizations) on statistics and its use in production decisions.*

## About Phenotype Screening Corporation

*Phenotype Screening Corporation provides whole plant characterization services for agriculture, horticulture and environmental communities. Established in 2004 we serve an international clientele with customized facilities and equipment to assess genetic, environmental and*

*treatment effects on plant health and development.*

*We utilize formal procedures and at the conclusion of every experiment we review results with our clients and discuss potential improvements in protocols, methods and measurements.*



*A key part of our research plan discussions is how many samples will make up each treatment comparison set. We believe our role in these discussions is to clarify the objectives of each trial and lead a conversation about the research objectives and what can be achieved with the specified sample size.*

*There are formalisms such as Statistical Power Analysis to guide in sample size decisions to meet specific objectives but such methods can require a priori knowledge that is not always available and can suggest numbers beyond available budgets. In such cases our objective is to bring the entire body of knowledge regarding the experiment, it's cost, its informative power, business risks, exogenous circumstances, etc, together to assist in making a well reasoned choice.*

*A key objective of the workshop is to develop a common understanding for us and our clients on maximizing the benefit of small sample size experiments to support the decision making process.*