



Phenotype Screening

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enabling discovery

2016 Hot Topic Workshop : 2nd 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 commercial researchers and 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=_1140WH8RC&bulk=y

A block of rooms has been reserved at a rate of \$159/night until October 19th.

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.

The national Hilton hotel chain may offer you a better deal on the website than our reserved room block rate. Please go ahead and sign up for the best deal you can get.

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."

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 mak-

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ing process.

(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

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.

Dr. Ronald Michaels, Technical Director, Phenotype Screening Corporation, **"Statistics within the Larger Framework of Decision Support Systems."**

Professor Vasileios Maroulas, The University of Tennessee, Department of Mathematics, **"Foundations of Small-Sample-Size Statistical Inference and Decision Making"**

Dr. Ronald Wasserstein, Executive Director, American Statistical Association, **"Doctor, It Hurts when I p"**

Stefan Conrady, Managing Partner, Bayesia USA, **"From Statistical Inference to Probabilistic Reasoning: An Example in the Biological Sciences."**

Professor Edzard Santen, University of Florida Department of Agronomy, **"Common Mistakes in Small Sample Size Biological Experiments and How to Avoid Them"**

Dr. Kater Hake, Vice president Agriculture & Environmental Research, Cotton Inc., **"What Growers Expect from New Product Introductions and Claims"**

Dr. Richard Woodward, Director International, Stoller USA, Inc., **"Increasing Precision in Agronomic Field Trials Using Latin Square Designs"**

Drs. Mary Kroner and Rebekah Kelly, Research Scientists, AgBiome Inc., **"Dealing with Multiple Variabilities: Deciphering Complex Organism Interactions in Pest x Microbe x Protein Bioassays"**

Dr. Rachel Hillmer, Biostatistician and Computational Biologist, Mendel Biological Solutions, **"Examining Residuals for Validation and Added Confidence"**



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.