

# TEXAS A&M PLANT BREEDING BULLETIN

December 2014

**Our Mission:** Educate and develop Plant Breeders worldwide

**Our Vision:** Alleviate hunger and poverty through genetic improvement of plants

## Texas A&M Plant Breeding Symposium

The Department of Soil and Crop Sciences will host the inaugural Texas A&M Plant Breeding Symposium, a one-day research conference for plant breeding, genetics, and related sciences. This year's theme is *Plant Breeding in the Modern Era*.

World-renown scientists will share their research on high throughput phenotyping, genomic selection, and breeding for host plant resistance.

The Texas A&M Plant Breeding Symposium will take place on Thursday, February 19, 2015, from 8:30 a.m. to 5:00 p.m. in the Memorial Student Center's Bethancourt Ballroom on the campus of Texas A&M University in College Station. Lunch will be provided for all registered attendees. An evening reception will be held at Café Eccell in Bryan, Texas. Appetizers and pizza will be provided at the informal social gathering.

The event is free, but registration is requested. To register, visit the symposium website at [pbsymposium.tamu.edu](http://pbsymposium.tamu.edu). For those who cannot attend the symposium, the event will be streamed live via web conferencing. Registration is required also for webinar access.

We are pleased to announce our speakers for the event: Dr. Michael Gore of Cornell University, Dr. Jianming Yu of Iowa State University, Dr. Fred Gmitter of the University of Florida, Dr. Russell Jessup of Texas A&M University, and Dr. Les Kuhlman of DuPont Pioneer.



Dr. Michael Gore will be speaking on high-throughput phenotyping and nutritional genomics. Michael is an associate professor of molecular breeding and genetics for nutritional quality and international professor of plant breeding and genetics at Cornell University. His expertise is in the field of quantitative genetics and genomics, especially the genetic

dissection of metabolic seed traits related to nutritional quality. He also contributes to the development and application of field-based, high-throughput phenotyping tools for plant breeding and genetics research.



Dr. Jianming Yu will share his findings and perspectives on genomic selection. Jianming is Pioneer Distinguished Chair in Maize Breeding and an associate professor in the Department of Agronomy at Iowa State University. The focus of Dr. Yu's program is to combine maize breeding with cutting-edge genomic technologies to address significant questions in quantitative genetics. Dr. Yu's research integrates knowledge in quantitative genetics, plant breeding, genomics, molecular genetics, and statistics, with the ultimate goal to develop and implement new strategies and methods in trait dissection and crop improvement.



Dr. Fred Gmitter will address breeding for resistance to citrus greening. Fred is professor with the University of Florida Institute of Food and Agricultural Sciences. Dr. Gmitter is a leading authority in citrus breeding for resistance to Huanglongbing (HLB, citrus greening), caused by the bacterium *Candidatus Liberibacter asiaticus*, which is considered the most serious threat to citrus production in the U.S. today. Dr. Gmitter and his team have sequenced the genomes of eight citrus cultivars to date, an accomplishment that could provide insights for resistance to citrus greening and numerous other citrus diseases. Other research includes genomic research to develop efficient ways to select improved plants and to enable cloning and manipulation of important genes; seedless cultivar development by mutation breeding and tissue culture methods; and citrus germplasm acquisition and characterization.



**Dr. Russell Jessup will speak on creation of dedicated bioenergy crops. Russell is an assistant professor in the Department of Soil and Crop Sciences at Texas A&M University where he utilizes molecular, cytogenetic, and classical plant breeding methods for improvement of perennial forage and bioenergy grasses. Dr. Jessup also has research interests in grasses used in turf, ornamentals, phytoremediation, and as renewable construction materials. Dr. Jessup seeks to develop molecular tools to assist in selection for such value-added breeding traits as perenniality, photoperiodism, and apomixis.**



**Dr. Les Kuhlman will be speaking about the application of genomics technologies to a commercial soybean breeding program. Les is a senior research scientist with DuPont Pioneer where he leads a breeding program developing elite MG3-4 soybean varieties. He also leads various research teams that study charcoal rot resistance, drought tolerance, and next generation breeding technologies.**

**The symposium will include a student research competition, featuring both oral and poster presentations with the winners receiving monetary awards. The competition is open to graduate and undergraduate students. Sign up today on our website: [pbsymposium.tamu.edu](http://pbsymposium.tamu.edu). The deadline to submit abstracts is February 1.**

**The Texas A&M Plant Breeding Symposium is made possible by the generous sponsorship from DuPont Pioneer. The event is part of a global network of plant science symposia supported by DuPont Pioneer. Additional financial sponsorship was provided by the Texas A&M University Departments of Horticulture and Biology, the Texas A&M University Molecular and Environmental Plant Sciences Interdisciplinary Program, and the College of Agriculture and Life Sciences. We appreciate the generosity of Cotton Incorporated who will provide T-shirts with the Texas A&M Plant Breeding Symposium logo. The symposium is organized entirely by a planning committee of graduate students studying plant breeding or related sciences.**

If you have any questions regarding this event, please email the Texas A&M Plant Breeding Symposium organizing committee at [pbsymposium@gmail.com](mailto:pbsymposium@gmail.com).

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## **Continuing and Distance Education in Plant Breeding at Texas A&M**

**Continuing education** course modules in plant breeding and genetics, and related disciplines are available from Texas A&M University to clientele interested in gaining new information in plant breeding or simply seeking refresher courses. This program is designed for individuals employed in private industry, CGIAR centers, government agencies, non-government organizations, and other agriculture professionals who need and desire additional knowledge and training in plant breeding but who are not interested in an additional academic degree. A professional certificate can be a part of this program. No campus visit is required. Course modules available for January through May 2015 are (<https://scsdistance.tamu.edu/purchase/>):

### **Basic Plant Breeding - Full Course (3 Units) - Cost - \$679.65 January 20-May 13, 2015**

*Unit 1 - Introduction to Basic Plant Breeding*      Cost - \$226.55  
*January 20 – February 20, 2015*

Introduction to Basic Plant Breeding provides a review of plant reproduction, genetic variation, gene banks, germplasm preservation, gene segregation, the power of selection and its role in plant breeding, and an introduction to intellectual property and its role in the life of a plant breeder. This unit is designed to prepare the participant to explore the genetics and methodologies employed by plant breeders of self and cross pollinated crop species in units two and three of Basic Plant Breeding.

*Unit 2 - Breeding Self Pollinated Crops*      Cost - \$226.55  
*February 23 – April 3, 2015*

The frequency of any specific heterozygous locus will be reduced by 50% for every generation of selfing, resulting in a mixture of homozygous lines within any natural population. Phenotypic selection within heterozygous generations will lead to homozygous or near homozygous germplasm lines or cultivars under self-pollination. This unit is designed to communicate plant breeding methodologies that take advantage of the genetic consequences of natural or forced self-pollination in agronomic crops. Topics will include: [1] the basics of segregation, [2] breeding methodologies, [3] the grain sorghum conversion program-an example of backcrossing in a different direction, [4] review of a commercial soybean cultivar development program, and [5] a review of the types of genetic releases from Texas A&M AgriLife Research.

*Unit 3 - Breeding Cross Pollinated Crops*      Cost - \$226.55  
*April 6 – May 13, 2015*

Topics covered include: quantitative genetics and plant breeding, effects of selection on Hardy Weinberg Equilibrium, mating designs with cross pollinated crops, breeding methods for cross pollinated crops, deviations from Mendelian ratios, genetic male sterility and hybrid seed production, seed certification and types of release.

### **Analysis of Complex Genomes – Full Course (3 Units) – Cost - \$679.65**

Genome structure, organization and function of model organisms and higher eukaryotes; theory and methodology of genetic and physical mapping, comparative genomics, sequencing, sequence analysis and annotation; emphasis on understanding the function of complex genomes, genome-wide expression analysis, genetic and epigenetic mechanisms; X-inactivation, imprinting, gene silencing, transposons, genome duplication and evaluation. Requires an in-depth and working knowledge of basic and advanced plant breeding concepts.

*Unit 1 – DNA Marker Technology and Genetic Mapping* Cost - \$226.55  
*January 20 – February 20, 2015*

*Unit 2 – Recombinant DNA and Cloning* Cost - \$226.55  
*February 23 – April 3, 2015*

*Unit 3 – Sequencing Genomes and Other Genomic Tools* Cost - \$226.55  
*April 6 – May 13, 2015*

### **Quantitative Genetics and Plant Breeding - Full Course (3 Units) - Cost - \$679.65**

Applied aspects of quantitative genetics in plant breeding; examination of methodologies to analyze quantitative variation in crop species; genetic phenomena (inbreeding, heterosis and epistasis); quantitative trait loci (QTL) mapping and marker-assisted selection (MAS); genotype by environment interaction, heritability multiple traits and selection theory with implications in plant breeding. Requires an in-depth and working knowledge of basic and advanced plant breeding concepts.

### **Intellectual Properties in the Plant Sciences - Full Course (3 Units) - Cost - \$679.65**

#### **January 20-May 13, 2015**

This course introduces the major foci of intellectual property (IP) impacting plant sciences, including: 1) traditional vs. emerging knowledge economies, 2) governing U.S. statutes and international treaties, 3) forms of IP protection, and 4) IP asset identification, valuation, capture, and deployment towards an understanding of best practices for the development of effective IP strategies and management of IP portfolios.

*Unit I - Introduction to Intellectual Property, International Treaties and Patents* Cost - \$226.55  
*January 20 – February 20, 2015*

Unit I of the Intellectual Properties in the Plant Sciences Course. Topics covered include: IP Culture and the Knowledge Economy, Traditional Knowledge vs. Biopiracy, Sui generis Systems, International Treaties, Overview of Patentability, Utility Patents, and Plant Variety Patents.

*Unit II - Intellectual Property Documentation* Cost - \$226.55  
*February 23 – April 3, 2015*

Unit II of the Intellectual Properties in the Plant Sciences Course. Topics covered include: Trademarks, Copyrights, & Trade Secrets; USPTO; Inventorship, Ownership, Compensation, IP Training; Confidential Information; IP Audit; IP Value; Competitive Intelligence; Cyberspace – IP and IT Cooperation.

*Unit III - Intellectual Property Transfer and Enforcement* Cost - \$226.55  
*April 6 – May 13, 2015*

Unit III of the Intellectual Properties in the Plant Sciences Course. Topics covered include: Intellectual Property Transfer and Enforcement, IP Case Studies, IP Portfolio, IP Strategy and Leveraging IP Value.

### **Introduction to Host Plant Resistance (1 Units) - Cost - \$226.55**

#### **January 20 – February 20, 2015**

Host plant resistance programs from the standpoint of the plant breeder.

**Other Continuing Education courses in plant breeding and related disciplines that will be available in the Fall 2015 and later include Host Plant Resistance; Selection Theory; Marker Assisted Selection; Genomic Analysis; Field Crop Diseases; Field Insects; Essential Nutrients in Crop Growth; and others. For more information visit <https://scsdistance.tamu.edu/> or contact LeAnn Hague, Distance Education Coordinator in Soil and Crop Sciences at [leann.hague@tamu.edu](mailto:leann.hague@tamu.edu) or (979)845-6148.**

**Distance Plant Breeding M.S. and Ph.D. degree programs at Texas A&M. Visit <https://scsdistance.tamu.edu/plant-breeding-distance-education/> for details.**

**Please direct comments concerning this bulletin to Wayne Smith, [cwsmith@tamu.edu](mailto:cwsmith@tamu.edu) or 979.845.3450.**