



TEXAS A&M PLANT BREEDING BULLETIN

January 2016

Our Mission: Educate and develop Plant Breeders worldwide

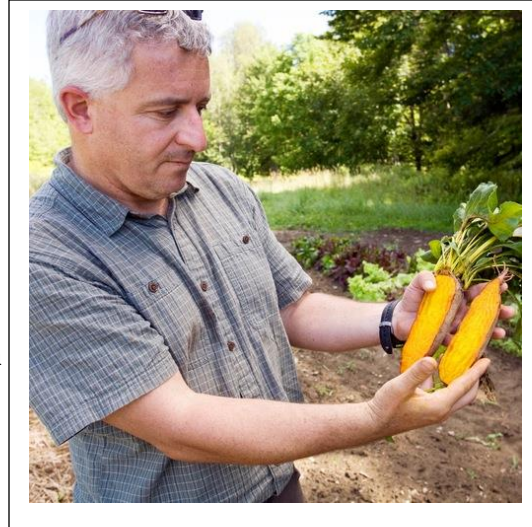
Our Vision: Alleviate hunger and poverty through genetic improvement of plants

The second annual Texas A&M Plant Breeding Symposium, *Healthier Food for a Healthier World*, a DuPont Plant Sciences Symposia Series Event, will be held on the campus of Texas A&M University on Thursday, February 18, 2016, at the Memorial Student Center • Room 2300 CDE. Information about the Plant Breeding Symposium and registration information can be found at <http://plantbreedingsymposium.com>. Those unable to attend can join via webinar.

This year's graduate student organized and run event features three new components. First, all registered symposium attendees will receive a lunch of food grown and prepared locally. The chefs at Ronin Cooking will give a presentation during lunch describing their plant variety selections, farming methodologies, and food preparation techniques. The second new component is a canned food drive to benefit the TAMU 12th Can organization on campus that works with the local food bank to feed the needy. Attendees are encouraged to bring cans of food and participants will be entered into a raffle for various prizes. Thirdly, graduate students studying plant breeding or related sciences from external universities were encouraged to apply for DuPont Pioneer Travel Scholarships. This year's recipients were Alex Ollhoff (Minnesota), Anna Levina (Cornell), Matt Mattia (Florida), and Clinton Stekett (Georgia). These students will receive \$350 in travel expenses plus hotel accommodations and will present their research results at the Plant Breeding Symposium. Congratulations to these outstanding plant breeding graduate students; we're looking forward to having them in Aggieland.

The theme for this year's symposium is *Healthier Food for a Healthier World*. A number of outstanding speakers will share research, business, and life's experiences with the students and other attendees. Speakers for the 2016 Plant Breeding Symposium are:

Dr. Irwin Goldman, Professor and Chair of the Department of Horticulture at the University of Wisconsin-Madison. Irwin's primary responsibilities are vegetable crop breeding and genetics and instruction in plant breeding, vegetable crops, and evolutionary biology. Dr. Goldman received his B.S. from the University of Illinois, M.S. from North Carolina State University, and Ph.D. from the University of Wisconsin. He also completed postdoctoral work at the University of Illinois. Dr. Goldman has been a faculty member at Wisconsin since 1992 and has served in a variety of administrative roles, including Associate Dean for Research, Vice Dean, and Interim Dean.



Dr. Kevin Murphy, Assistant Professor at Washington State University, received his B.S. in Biology from Colorado College, after which he spent seven years working on a wide range of vegetable, fruit tree, and livestock-integrated farms in Arkansas, Michigan and Washington. While managing a diversified farm on the Olympic Peninsula, Kevin and his crew grew over 500 cultivars of 60 different crops. Motivated by these experiences, and a desire to develop resilient cultivars of under-utilized, flavorful and nutritious crops, Kevin received his M.S. in 2004 and Ph.D. in 2007 from Washington State University in organic and perennial wheat breeding. Kevin and his team of students and researchers work on breeding and agronomy of amaranth, barley, buckwheat, oca, perennial wheat, proso millet, quinoa, spelt, and teff. He has participated in international research and extension projects in Syria, Iraq, Pakistan and Malawi, and is currently coordinating an international quinoa breeding project in ten countries in collaboration with the FAO.





Dr. Kevin Pixley, Director-Genetic Resources Program-CIMMYT, has a B.S. in agronomy from Purdue, an M.S. in crop physiology from the University of Florida, and a Ph.D. in plant breeding from Iowa State University (1990). Kevin began his career at CIMMYT as a postdoctoral fellow and in 1993 moved to Harare, Zimbabwe as a maize breeder at the CIMMYT research station and became team leader of the program 1997. After 11 years in Africa, he returned to CIMMYT headquarters in

Mexico to serve in directing positions in the Global Maize Program. He currently is director of CIMMYT's Genetic Resources Program and leads the Seeds of Discovery project, which is developing an open-access platform of genomic and phenotypic databases along with informatics tools to facilitate the use of maize and wheat biodiversity in applied research and breeding programs. His accomplishments include the development of disease resistant and nutritionally enhanced maize cultivars.



Dr. Kevin Crosby, Associate Professor at Texas A&M University Department of Horticulture, conducts research in plant breeding and genetics of melon, pepper, tomato, onion and carrot. The main emphasis of his research has been the elucidation of genetic mechanisms for stress tolerance and enhanced nutritional quality. Dr. Crosby has discovered several novel traits and studied their inheritance in both melon and pepper. These range from root

physiology and vigor to virus and insect resistance. His program also has developed a genetic linkage map of melon with DNA markers linked to several key traits. The

development of thousands of novel families for genetic studies has produced elite breeding lines for commercial seed companies and nine cultivar releases. In addition, Dr. Crosby has developed unique, high antioxidant pepper lines with flavonoid and ascorbic acid levels more than 400% higher than commercial cultivars. Dr. Cosby received his B.S. in Horticulture from Texas A&M, his M.S. in Horticulture/Plant Breeding from the University of Hawaii, and his Ph.D. in Plant Breeding at Texas A&M.



Dr. Jim Gaffney, Strategy Lead-Biotech Affairs and Regulatory-DuPont Pioneer, joined Pioneer in the fall 2010 and works on advancing agronomic traits that help crops better use water and nitrogen. Jim grew up on a corn, soybeans, and hog enterprise farm in southwest Minnesota and earned his B.S. at the University of Minnesota, followed by his M.S. at South Dakota State University and Ph.D. at the University of Florida. Dr. Gaffney is passionate about improving African Agriculture – an

interest that dates back to his time as a Peace Corps volunteer in Cameroon, Central Africa where he worked at an agricultural technical school.

Dr. Eric Jackson, Principal Geneticist/Systems Biologist, noted recently that General Mills sees genomics as providing the “tools to create better varieties of blueberries, strawberries, oats, broccoli and other crops we focus on down the road. Once we map the pathways, we can start developing practical, applied technologies to get the science to the table and benefit human health.” General Mills is the world’s sixth-largest food



company. As the producer of Cheerios and one of the largest users and handlers of oats in North America, the company is committed to research that uses natural and traditional breeding methods to yield an oat with higher and more consistent levels of beta-glucan. Beta-glucan is a clinically proven, cholesterol-reducing soluble fiber.

The graduate student organizing committee for this year's Plant Breeding Symposium are:

Laura Masor, Molecular and Environmental Plant Sciences Ph.D. candidate (lmasor@tamu.edu)

Brian Pfeiffer, Plant Breeding Ph.D. candidate (pfeiffer@tamu.edu)

Smit Dhakal, Plant Breeding Ph.D. candidate (smit.dhakal@tamu.edu)

Francisco Gomez, Plant Breeding Ph.D. candidate (fgomez@tamu.edu)

Ammani Kyanam, Plant Breeding Ph.D. candidate (akyanam@tamu.edu)

Dustin Wilkerson, Plant Breeding M.S. candidate (dgwilkerson14@tamu.edu)

Complete information about the Texas A&M Plant Breeding Symposium can be found at <http://plantbreedingsymposium.com>. We hope that you can join us live or via webinar. For additional information, contact any of the organizing committee or Amanda Ray at Amanda.ray@tamu.edu.



Edgar S. McFadden Symposium on Wheat Improvement and Winter Wheat Workers Workshop



In 1916, Edgar S. McFadden envisioned and accomplished the first major breakthrough in conferring genetic resistance to stem rust. From a single seed, his work is still making a critical difference today, feeding millions of people globally. Join us as Texas A&M University and South Dakota State University continues his legacy by honoring him and other global leaders in wheat research at the Edgar S. McFadden Symposium on Wheat Improvement.

April 17-20, 2016
San Antonio, Texas

Schedule of Events

Sunday, April 17 – Reception

Monday, April 18 – McFadden Symposium

Tuesday, April 19 – Winter Wheat Workers
Workshop

Wednesday, April 20 – Castroville, Texas
Wheat Field Nursery Tour

<http://mcfaddensymposium.tamu.edu>



Joint Edgar McFadden Symposium/ Hard Winter Wheat Workers Workshop

San Antonio, TX - April 17 – 20, 2016

Organized by Texas A&M University, South Dakota State University, and
Hard Winter Wheat Workers

Poster Abstract Guidelines

Abstracts are required from all poster presenters. Abstracts should be sent to Dr. Shuyu Liu (SLiu@ag.tamu.edu) by **February 29, 2016**. Approximately 20 posters will be selected for display at the symposium. You will be notified about poster selection by March 15, 2016.

Abstract Guidelines

Length

The abstracts should consist of less than 350 words describing the paper or poster. They should highlight significant results, and include interpretation of the important results, as well as essential aspects of experimental procedure. Abstracts of general presentations should provide a synopsis of what will be discussed in brevity.

Measurements

All measurements discussed in the abstract should be from the metric system.

Scientific nomenclature

Scientific names of plant species, insects, weeds, plant pathogens, etc should be cited at the first mention of the pest, whether in the title or the text abstract. Follow the common name with the scientific name in parenthesis and underlined.

Tables and Figures

Not to be included in the abstract.

Transmittal

Send abstracts, together with title, presenter's and co-authors' names, affiliation, and presenter or corresponding author's email address electronically (WORD format) to Dr. Shuyu Liu (SLiu@ag.tamu.edu).

Instructions for Selected Poster

The organizing committee will provide 48" × 48" foam-core boards for mounting the poster. Mounting material such as Velcro, push pins as well as easels will also be provided. Presenters are encouraged to be present during the poster times to answer audience questions.

Poster setup will start on Sunday, April 17, 2016 at 4:00 p.m. or upon the arrival of the presenter. All posters must be removed by 5:00 p.m. on April 19, 2016

Questions

If you have any questions, please email or call Shuyu Liu (SLiu@ag.tamu.edu; Ph:806-677-5607) or Amir Ibrahim (email: aibrahim@ag.tamu.edu; Ph: 979-845-8274).

**Distance Plant Breeding Program and Continuing Education courses
available for Spring 2015 (<https://scsdistance.tamu.edu/available-courses/>).**

**Continuing Education Available Courses
Spring Courses: January 19– May 11, 2016**

To fully participate in our continuing education courses, students should have:

- High speed internet connection and updated browsers, including Internet Explorer and either Chrome or Firefox
- Common plug-ins (e.g. Adobe Reader, Flash Player, Virus Protection, Java, etc.)
- Speakers and Webcam with microphone
- Skype
- Ability to either scan or fax course documents to the instructor

Spring 2015

**Plant Breeding Fundamentals – Full Course (3 Units) – Cost \$679.65
January 19-May 11, 2016**

Introduction to the field of plant breeding for students without a plant breeding background. Includes common plant breeding terminology and introduction of concepts. Genetic improvement of crops by hybridization and selection; special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated and asexually reproduced plants.

**Basic Plant Breeding - Full Course (3 Units) - Cost - \$679.65
January 19-May 11, 2016**

Basic Plant Breeding can be taken as an entire course (all three units) or each unit can be taken individually. For participants in our Professional Certificate in Plant Breeding and Genetics, completion of all three units is required.

Unit 1 - Introduction to Basic Plant Breeding *Cost - \$226.55*
January 19 – February 19, 2016

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 22 – April 1, 2016

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 1 – May 11, 2016

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.

Recommended textbooks are “Breeding Field Crops” by J.M. Poehlman and D.A. Sleper, and “Principles of Cultivar Development” by W.F. Fehr. A final exam will allow the participant to assess their grasp of topics covered. Participants in the Plant Breeding and Genetic Certificate Program must score 70% on the final exam for each unit.

This is a "self-paced" course and is available for viewing for a limited time. Time commitment is individual student driven. Few outside assignments are made. Students should view each lecture, review all previous lectures and be prepared to discuss any issues that are unclear. Each unit has a printable note set and most units have a set of review questions that can be used as a tool to check your comprehension and grasp of unit concepts. Feel free to contact the instructor, Dr. Wayne Smith, by e-mail (cwsmith@tamu.edu) or phone (979-845-3450) with any questions you have or if you need additional information.

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

January 19-May 11, 2016

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 19 – February 19, 2016

Unit 2 – Recombinant DNA and Cloning Cost - \$226.55
February 22 – April 1, 2016

Unit 3 – Sequencing Genomes and Other Genomic Tools Cost - \$226.55
April 1 – May 11, 2016

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

January 19-May 11, 2016

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 19-May 11, 2016

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 19 – February 19, 2016

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 22 – April 1, 2016

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 1 – May 11, 2016

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 19 – February 19, 2016

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

Other Academic and Continuing Education courses in plant breeding and related disciplines that will be available during other semesters include Host Plant Resistance; Crop Production; 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 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 or 979.845.3450.