

TEXAS A&M PLANT BREEDING BULLETIN

May 2017

**TEXAS A&M UNIVERSITY--EDUCATING AND DEVELOPING PLANT BREEDERS
WORLDWIDE TO ALLEVIATE HUNGER AND POVERTY THROUGH GENETIC
IMPROVEMENT OF PLANTS**

Our distance graduate program in Plant Breeding has graduated four students during the past year. Dr. Chad Hayes received his Ph.D. in May 2016 and was featured in our June 2016 Plant Breeding Bulletin. In May, 2017, three more distance students received their degrees in plant breeding. Laura Brown and Manuel Michel receive their M.S. degrees while Dr. Nan-Yen Chou received her Ph.D. degree. I asked each to comment on their experiences as distance students and to tell us a bit about themselves and current activities.

Laura Brown received her M.S. in Plant Breeding through the Department of Horticultural Sciences at Texas A&M. Laura is currently employed in California at Enza Zaden as a watermelon breeder. Laura commented: “The distance program at TAMU has allowed me to greatly expand my plant breeding knowledge.



While raising three boys and working full time I was able to earn my Master of Science degree in Plant Breeding. I could not have done this

without the flexibility provided by the distance degree program. Working in the industry while going to school allowed me to apply my new knowledge and skills right away; this really reinforced what I was learning in the classroom.”

When not breeding watermelons, Laura hiking, reading, traveling, and spending time with her family.

Manuel Michel received his M.S. in Plant Breeding through the Soil and Crop Sciences Department. His thoughts on our distance program were: I had a great experience as a distance student; help was always available and professors from the department were very understanding on students having a full time job. LeAnn was awesome in helping out and making sure I was on track to graduate. All resources needed to complete any task were available. Awesome program!



Manuel noted that he enjoyed soccer, gardening, truck shows, and working on his show truck. He is currently employed by Monsanto as a Field Testing Agronomist with responsibilities from Dallas, TX to the Lower Rio Grande Valley (about 700 miles N to S).

Nan-Yen Chou received her Ph.D. in Plant Breeding in May and is employed as a hybrid rice breeder with CPS (Crop Production Services) in Texas. Dr. Chou noted: “ I want to say that I’m really

thankful to Dr. Smith, LeAnn, and all other members involved with the program that made it possible for me who continue working and to fulfill my goal of obtaining my Ph.D. degree. I also I'd like to thank Dr. Johnson, Dr. Hague, and my committee members, Dr. Abrihim and Dr. Jessup, for their understating and many communications through email exchanges over the past four years.I am really grateful for this distance education program that gave me a chance to fulfill my goal pursuing Ph.D. degree.



Nan-Yan's hobbies included bicycling and running, cooking, movies, and "adventurous things that I have never attempted." Currently she is leaning Spanish and guitar.

Dr. Chou's dissertation was entitled NOVEL HYBRID RICE SEED PRODUCTION METHOD INCORPORATING HERBICIDE TOLERANCE

Our congratulations to these dedicated students who will make a difference in the lives of many.

Meetings of Interest Meetings of Interest

National Association of Plant Breeders, NAPB

will hold their annual meeting at the UC Davis Activities and Recreation Center August 7 – 10, 2017. More information will be available soon at <https://www.plantbreeding.org>.

American Society of America, Crop Science Society of America, and Soil Science Society

of America will host more than 4,000 scientists, professionals, educators, and students at the 2017 International Annual Meeting, “Managing Global Resources for Secure Future,” October 22 – 25, 2017 in Tampa Florida. Additional information at <https://www.acsmeetings.org/>.

Dupont Plant Sciences Symposia events for 2017.

Additional information can be found at

<https://www.pioneer.com/home/site/about/research/PlantSciSymposiaSeries/>.

[University of Missouri, February 2](#)

[Texas A&M University, February 16](#)

[University of Minnesota Production Agriculture Symposium, Feb 22](#)

[Iowa State University, March 3](#)

Cornell University, March 10

University of Nebraska - Lincoln, March 14

Washington State University, March 17

University of Minnesota, March 23-24

University of Saskatchewan, March 31-April 1

***Kansas State University, April 7**

University of Florida, April 13

Huazhong Agricultural University (China), April 17

University of California - Davis, April 21

University of Georgia, May 9

University of California - Berkeley, June 2

*** Event receives sponsorship support but is not officially part of the series**

Distance Plant Breeding at Texas A&M

Distance Plant Breeding at Texas A&M

Distance Plant Breeding Program and Continuing Education courses available for Fall 2017

(<https://scsdistance.tamu.edu/available-courses>)

Continuing Education

Available Courses

Summer Courses: May 22 – September 1, 2017

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
- Google Chrome or Mozilla 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

Summer 2017

Plant Breeding Fundamentals – Full Course (3 Units) – Cost \$679.65

May 22 – September 1, 2017

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. Course topics: Botany and genetics; Evaluation of Populations; Manipulation of Populations; and Plant Breeding Systems.

Basic Plant Breeding - Full Course (3 Units) - Cost - \$679.65

May 22 – September 1, 2017

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

May 22 – June 23, 2017

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

June 26 - July 28, 2017

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

July 31 - September 1, 2017

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 info

Fall Courses: August 28 – December 15, 2017

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
- Google Chrome or Mozilla 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.

Fall 2017

Plant Breeding Fundamentals – Full Course (3 Units) – Cost \$679.65

August 28 - December 15, 2017

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

August 28 - December 15, 2017

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

August 28 – September 29, 2017

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*

October 2 – November 3, 2017

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*

November 6 – December 15, 2017

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.

Advanced Plant Breeding - Full Course (3 Units) - Cost - \$679.65

August 28 - December 15, 2017

Expectations of genetic improvement for different plant breeding methods; relative efficiency for crops of different reproductive mechanisms; genetic variances, covariances and genotype-environment interaction components of variance used in planning selection procedures.

Advanced 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 - Advanced Genetic Principles in Plant Breeding

August 28 – September 29, 2017

Topics covered include: Hardy Weinberg, means and variances, covariances and heritability, mating designs, genetic diversity.

Cost - \$226.55

Unit 2 - Selection: Theory and Practice in Advanced Plant Breeding

October 2 – November 3, 2017

Topics covered include: recurrent selection, inbred line selection and testcrossing, selection environments, indirect selection, multiple trait selection, QTL MAS, heterosis and hybrid prediction.

Cost - \$226.55

Unit 3 - Statistical Tools in Advanced Plant Breeding

November 6 – December 15, 2017

Topics covered include: statistical concepts review, expected mean squares and combined analysis, GxE interactions and stability analysis, polyploidy.

Cost - \$226.55

Experimental Designs in Agronomic Research - Full Course (3 Units) - Cost - \$679.65

August 28 - December 15, 2017

Teaches fundamental principles and procedures of experimental designs in agricultural sciences. Emphasis includes factorial designs, predicting outputs, use of covariance, and balanced and unbalanced experimental designs as related to common agricultural research projects under field, greenhouse or growth chamber culture. Students will become familiarized with computer programming of common statistical software. Experimental Designs in Agronomic Research 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 - Factorial Experimental Designs in Agronomic Research

August 28 – September 29, 2017

Topics covered include: Fundamentals of agricultural research methodology and methodology, basic statistical concepts for testing of hypothesis, introduction to simple computer statistical software programs and applications, complete randomized design, randomized complete block design, and Latin square design.

Cost - \$226.55

Unit 2 - Factorial and Unbalanced Designs in Agronomic Research
October 2 – November 3, 2017

Topics covered include: Split-plot and split-split plot designs, nested designs, variance analyses, interactions with years and locations, comparisons of paired and grouped mean, estimation of missing values, the general linear model, and planned incomplete block design.

Cost - \$226.55

Unit 3 - Correlation, Regression, Covariance, and Biplot Analysis in Agronomic Research

November 6 – December 15, 2017

Topics covered include: Correlation, regression, path coefficient analysis, covariance analysis, nearest neighbor analysis, augmented designs and moving means and analysis, database management, biplot analyses.

Cost - \$226.55

This is a "self-paced" course and is available for viewing for a limited time. Time commitment is individual student driven. 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 voiced over PowerPoint video lectures.

Distance Degrees in 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.**