

TEXAS A&M PLANT BREEDING BULLETIN

May 2019

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



Borlaug Scholars

NAPB NEWS FOR IMMEDIATE RELEASE

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NAPB Announces 2019 NAPB Borlaug Scholarship Awards!

May 7, 2019 – The [National Association of Plant Breeders](#) (NAPB) is recognizing 12 outstanding students for **the 2019 class of NAPB Borlaug Scholars**:

NAPB Borlaug Graduate Scholars

Zaki Afshar, Colorado State University
Jessica Chitwood, University of Florida
Heather Manching, University of Delaware
Stephanie Sjoberg, Washington State University
Daniel Sweeney, Cornell
Caio Canella Vieira, University of Missouri

NAPB Borlaug Undergraduate Scholars

Tannis Anderson, University of Minnesota
Adrienne Blakey, Oklahoma State University
Adam D'Angelo, Rutgers
Elizabeth De Meyer, Cornell
Jordan Knapp-Wilson, University of Arizona
Sarah Marsh, Texas A&M University

The NAPB Borlaug Scholarship awards are given to exceptional students aspiring to a career in the field of Plant Breeding and Genetics and who have a strong desire to contribute to the improvement of the plants that we all depend upon for our daily needs. This is especially critical in this age of continually increasing populations, climate change, and uncertain global food security, all things that [Dr. Norman E. Borlaug](#) cared deeply about. Plant Breeding uniquely addresses these challenges through applied research and improving technologies.

These awards include a travel grant (valued up to \$1500) to attend the [2019 NAPB Annual Meeting](#) at **Calloway Gardens in Pine Mountain, GA, August 25-29, 2019**, plus participation in a professional development mentoring program that connects these scholars with experienced NAPB professional members. Awards come with a gratis new student membership in NAPB and complimentary registration for the conference. The students were selected from an impressive field of nominees with strong recommendations from professors and advisors through a rigorous national competition. NAPB invites all plant breeders and colleagues to congratulate and support these outstanding future scientists, leaders, and professional colleagues!

The NAPB Borlaug Scholarship awards were initiated last year with an inaugural class of eight students, who attended the first internationally held NAPB Annual Meetings in Guelph, Canada. Due to extraordinary success and interest in the program, we experienced a 25% increase in quality nominations for 2019. In response to the increased excitement around NAPB Borlaug Scholars, the selection committee increased the number of awards by 50%, exceeding the original goal.

This flagship scholarship program is closely aligned with the mission of NAPB:

The National Association of Plant Breeders strengthens plant breeding to promote food security, quality of life, and a sustainable future.

To share in this mission, plant breeders, interested professional colleagues, and supporters are encouraged to [join NAPB](#).

This program is continually funded by generous gifts of any amount to the [NAPB/ASF Borlaug Scholars Fund](#) by individuals and institutional donations. Continued donations from colleagues and institutions who support our motto “Improving Plants to Improve Lives” will insure that we can continue to encourage and nurture future generations, much as Dr. Borlaug during his career. Continued support will allow NAPB to grow the NAPB Borlaug Scholars Program so that we can recognize more of these outstanding young people and the universities that educate them. We need your support!!

Please consider [donating online today!](#)

Additional information, including profiles of the winners, will be forthcoming in future releases.

Meetings of Meetings of Interest

National Association of Plant

Breeders, NAPB will hold their annual meeting at the University of Georgia, August 25-29, 2019. More information will be available soon at <https://www.plantbreeding.org>.

American Society of Agronomy-Crop Science Society of America-Soil

Science Society of America will hold their annual meeting November 10 – 13, 2019 in San Antonio, Texas. More information available at <https://www.acsmeetings.org/>.

Distance Plant Breeding at Texas

Distance Plant Breeding at Texas

A&M – Continuing Education

Available Courses

Summer Courses: May 28 – August 12, 2019

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**

Summer 2019

Plant Breeding Fundamentals – Full Course (3 Units) – Cost \$679.65
May 28 – August 12, 2019

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
May 28 – August 12, 2019

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 28 – June 21, 2019

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 24 – July 19, 2019

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 22 – August 16, 2019

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.

Fall Courses: August 27 – December 14, 2018

Fall 2019

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

August 26 - December 11, 2019

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 26 - December 11, 2019

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 26 – September 27, 2019

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
September 30 – November 1, 2019

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 4 – December 11, 2019

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 26 - December 11, 2019**

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 26 – September 27, 2019

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

September 30 – November 1, 2019

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 4 – December 11, 2019

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 26 - December 11, 2019

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 26 – September 27, 2019

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

September 30 – November 1, 2019

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 4 – December 11, 2019

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.

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

August 26 - December 11, 2019

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

August 26 - September 27, 2019

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

September 30 - November 1, 2019

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

November 4 - December 11, 2019

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.

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 at Texas A&M Graduate Degrees

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.