**Computational Genomics**
**Workshop of Genomic Prediction**
**Northeast Agricultural University, Harbin, China, December 26-30, 2016**

**Professor:** Zhiwu Zhang (Zhiwu.Zhang@wsu.edu)
**Teaching assistants**: Jiabo Wang, You Tang, and Zhao Li
**Classroom:** 成栋楼 233 机房
**Lecture:** 8:30AM-Noon
**Lab:** 1:30-5:00 PM

**Objective:** Develop concepts and analytical skills for modern breeding by using genomic prediction in framework of mixed linear models and Bayesian approaches.

**Text Book:** There is no required textbook. Each lecture will be accompanied by a handout that covers all of the in class material and more in-depth material that is beyond this course. For students who would like to have a general reference book, I recommend a free book (academia): Genome-Wide Association Studies and Genomic Prediction http://link.springer.com/book/10.1007%2F978-1-62703-447-0

**Assessments:** Attendance (10%), participation (20%), exam (30%) and Homework (40%).

**Grade and Certificate**: A (93%-100%); A- (90%-93%); B+ (87%-90%); B (83%-87%) B- (80%-83%); C+ (77%-80%); C (73%-77%); C- (70%-73%) D+ (66%-70%); D (60%-66%); F(0%-60%). Note: The upper grade will be assigned to a score at a cutting point without rounding. For examples, score of 93.00% receives "A" and score 92.99% receives "A-". Certificate is available only for grade of D and above.

**Homework**: Due at 8:30 AM on Dec 28 (HW1) and Dec 30 (HW2).
**Exam**: December 30, 90 minutes (3:30-5:00PM), 50 questions.

**Schedule**

| Lecture | Date | CROPS545* | Title | HW Due |
|---|---|---|---|---|
| 1 | 12/26/16 | 1 | Syllabus/course overview and introduction | |
| 2 | 12/26/16 | 8 | Genetic architecture and simulation of phenotype | |
| 3 | 12/27/16 | 22 | Marker Assisted Selection (MAS) | |
| 4 | 12/27/16 | 23 | Model fit and cross validation accuracy | |
| 5 | 12/28/16 | 24 | genomic Best Linear Unbiased Prediction(gBLUP) | HW1 |
| 6 | 12/28/16 | 25 | Ridge regression (rrBLUP) | |
| 7 | 12/29/16 | 27 | Bayesian theory | |
| 8 | 12/29/16 | 28 | Bayesian methods | |
| 9 | 12/30/16 | 29 | Bayesian implementation | HW2 |
| 10 | 12/30/16 | 30 | BLUP alphabet | |

*The equivalent lecture number in CROPS545 (Statistical Genomics) at Washington State University. PPT and R code are available at http://zzlab.net/StaGen.