Careers in Crop Improvement

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The Grand Challenge

- World population estimated at >9B by 2050
- Increased meat consumption in emerging economies as the standard of living increases
- No appreciable change in available crop land
- Falling water tables globally
- Climate change will increase risk

Crop yields must increase 2- to 3-fold by 2050 to meet the projected demand for food, feed, fiber, and fuel
Crop improvement involves the cycle of creating and exploiting genetic variation.

Create useful genetic variation

Exploit genetic variation to achieve genetic gain toward targeted goals

Define genetic specificity underlying phenotypic expression

Biotechnology

*Mumm and Moose, 2009*
Multiple disciplines come into play

**Conventional Breeding**
- Genetics: Quantitative, Population
- Plant breeding methods
- Selection theory
- Statistics & experimental design
- Knowledge of germplasm
- Phenotypic evaluation

**Agronomy/Botany**
- Plant Physiology
- Plant Biology
- Soil Science
- Pathology
- Entomology

**Engineering**
- Profiling equipment
- Analytics e.g. grain composition
- Robotics
- Nanotechnology

**Molecular Biology**
- Biochemistry
- Molecular genetics
- Genomics
- Transformation & tissue culture
- Sequencing
- Molecular marker technologies
- Gene cloning

**Data Management, Analysis, Display**
- Bioinformatics
- Information Technology
- Information Management
- Computer programming
- Simulation & Modeling
- Statistical and mathematical theory
The Illinois Plant Breeding Center

- 29 faculty with specializations across crops and across disciplines
- Focus on educating the next generation of scientists in crop improvement, which of course includes conducting contemporary research that fosters education goals in terms of relevance, quality, impact at the Illinois/US/global levels, and multi-disciplinary team orientation
- Graduate student enrollment has nearly doubled since 2008!
- 21 fellowships supported by industry and private donors
- Learn more at [http://plantbreeding.illinois.edu](http://plantbreeding.illinois.edu)
Whether in an industrial or an academic setting, consider a career in plant breeding!

- High demand
- High tech
- Highly innovative
- High impact
- High compensation
- Inclusive
- Global opportunities
- GREAT JOB!