

Center for Applied Genetic Technologies

Technology-driven
Genotype-to-phenotype research space
Product driven



Adjacent to greenhouse space.



CAGT Faculty



Wayne Parrott (198?):
Plant transformation,
biotechnology, insect
resistance



Zenglu Li (2012): Soybean
breeding,
molecular/genomic
breeding, phenomics,
drought



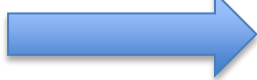
Ali Mossaui (2012):
Feedstock/biofuel
breeding, phenomics



Scott Jackson (2011):
Plant genomics, marker
development,
germplasm
enhancement

Ongoing search: Quantitative genetics/genomics

Technology

Genotype  Phenotype

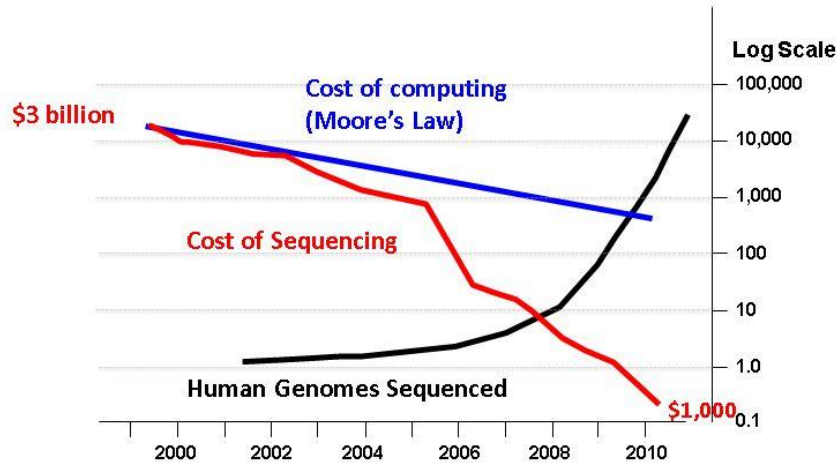
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Genotyping

Adapted from
The Economist

The Sequencing Explosion



- Maize and soybean cost ~\$25-50 Million
- We can now resequence soybean for ~\$500.
- The human genome was a game changer for human medicine.
- How will this play out in agriculture?

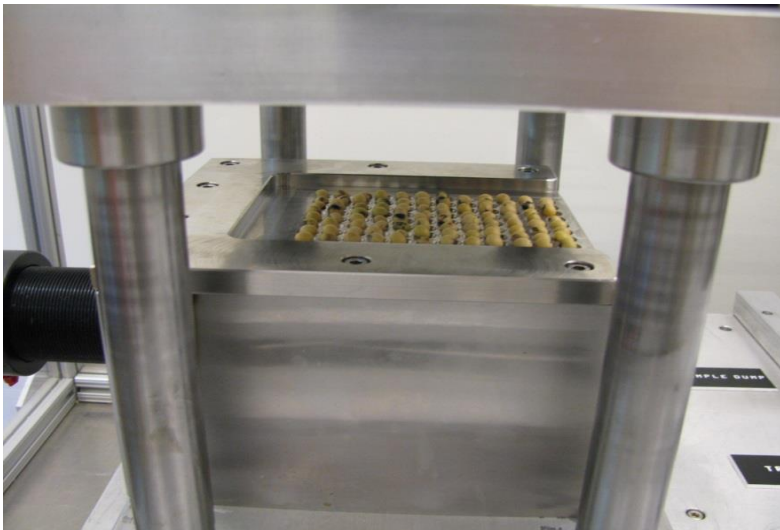
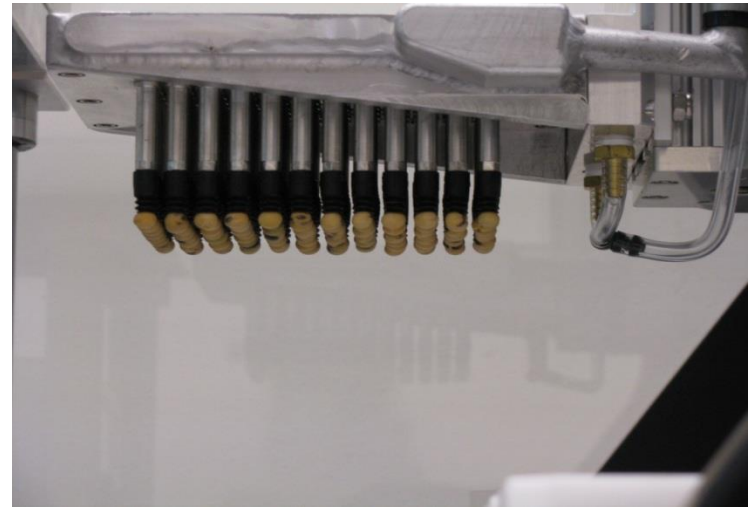
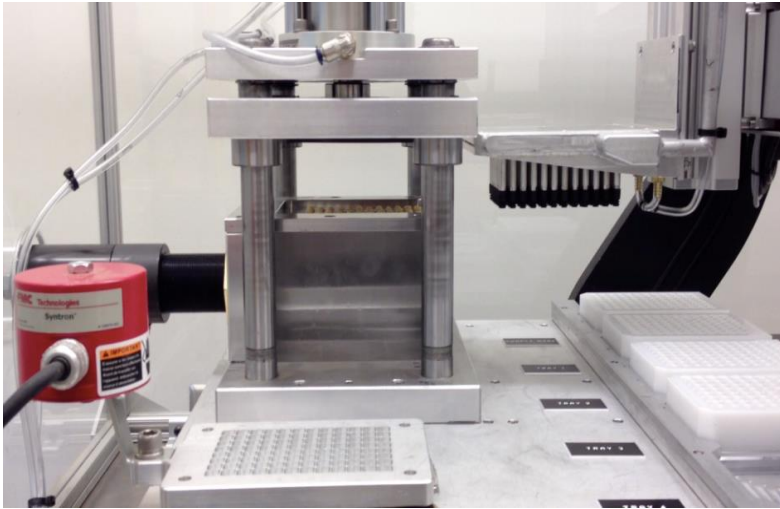


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\$120,000

5x coverage of human genome, ~\$900

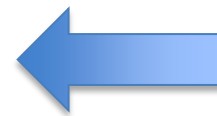
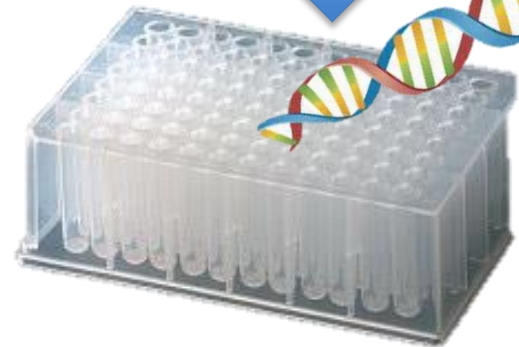
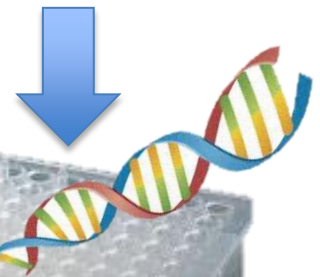
Seed Chipping & Marker Technology Play an Important Role in Accelerating Soybean Breeding



High-Throughput DNA Extraction from Leaf and Seed Samples



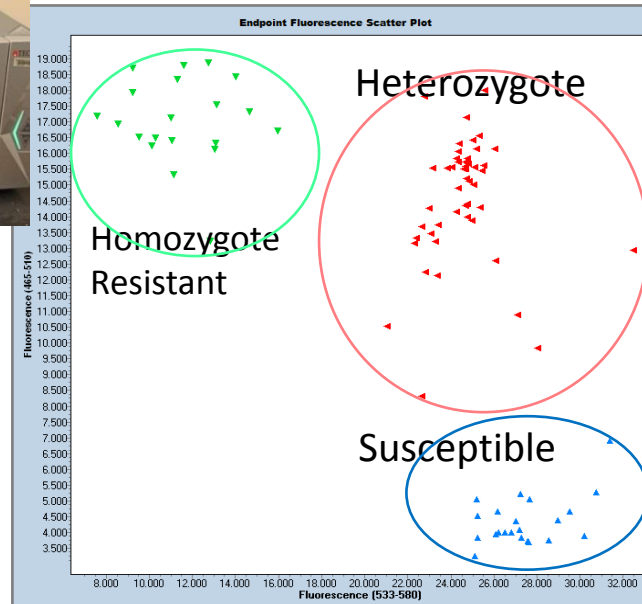
Bravo Liquid Handler



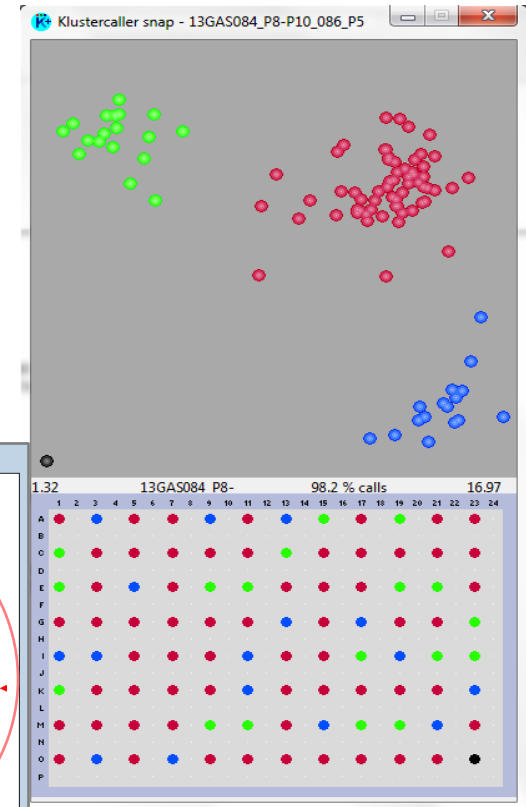
Mantis Dispenser

High-Throughput Genotyping SNP Assays For Molecular Breeding

- Robust markers for genotyping
- Over 40,000 samples were screened 2013



Homozygote Resistant



Heterozygote

Susceptible

Phenotyping



High Throughput Seed Composition Analysis

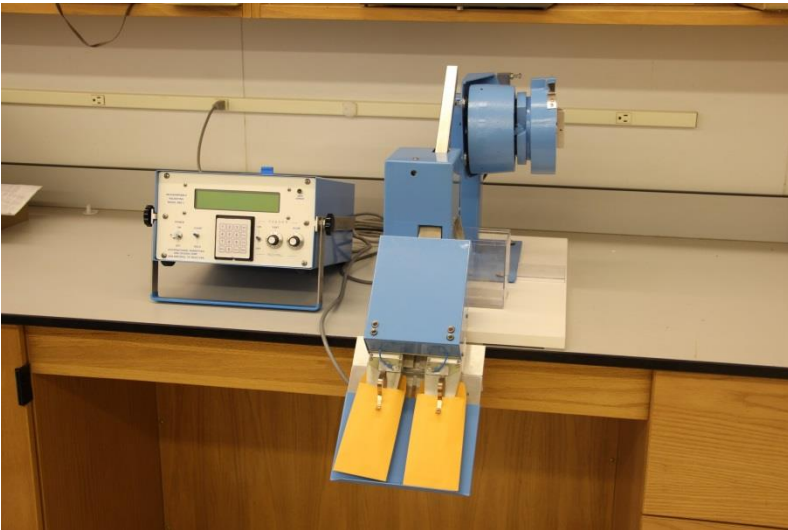
Phenotyping

Advanced Seed Packaging Equipment

Accufast P4 Small Card & Packet Printer



Precision and high speed seed counter



Phenotyping

Advanced Field Plot Equipment

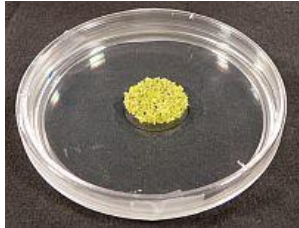
Plot combine

GPS guided precision planter



Single plant threshers

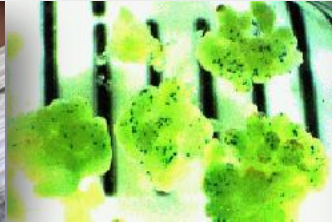
Biotechnology: Plant transformation



Somatic embryos
4 days



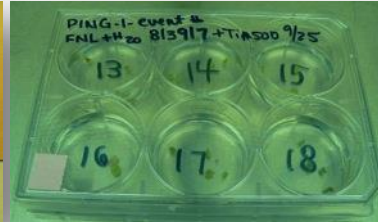
Bombardment
1 day



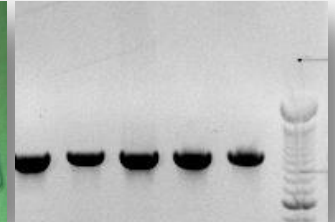
Recovery
1 wk



Selection
6-8 wk



Tissue amplification and PCR
4-6 wk



Greenhouse
3 mo



Conversion
1-2 mo



Germination
1-2 wk



Desiccation
1 wk

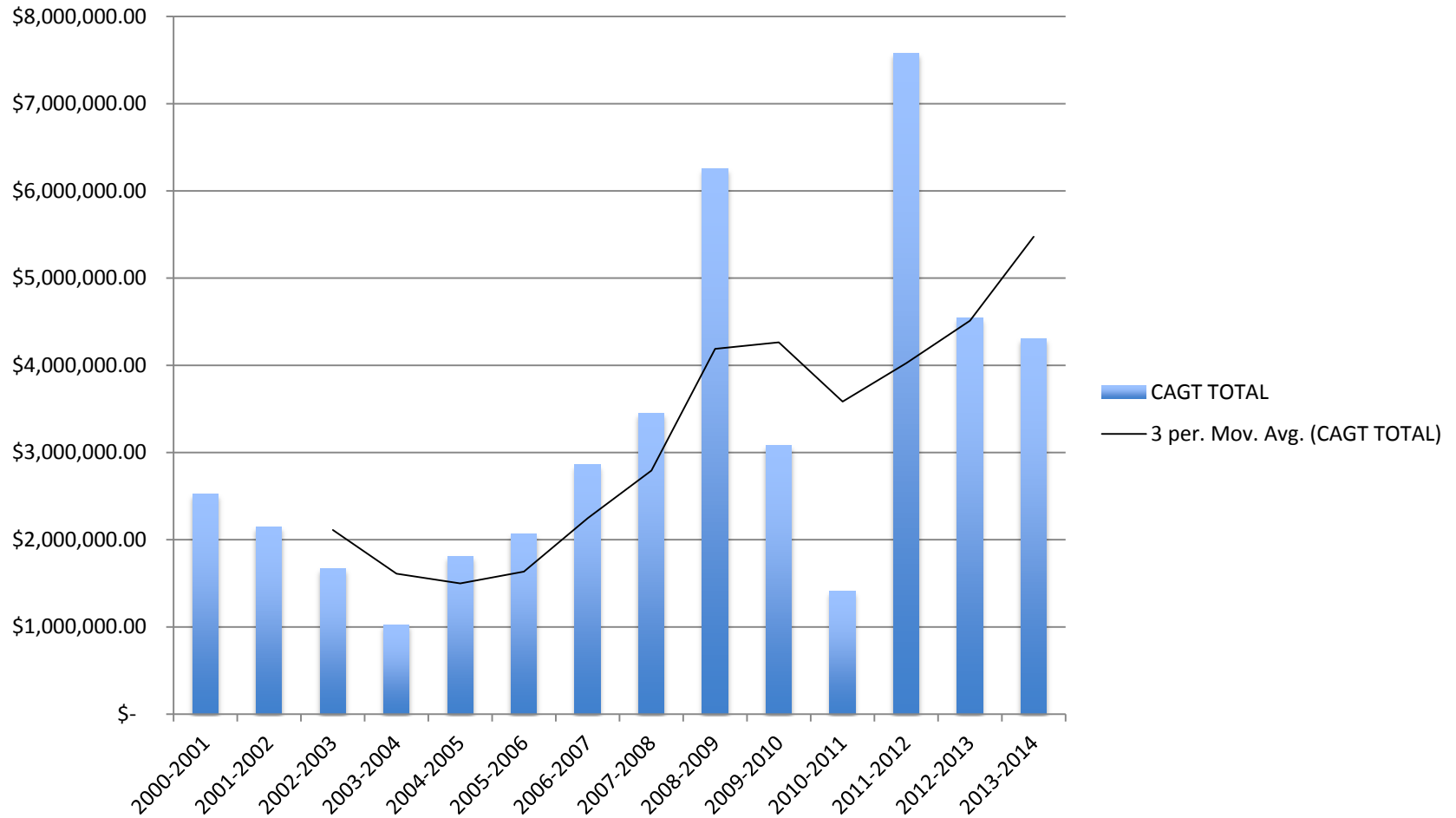


Differentiation
5-8 wk



Metrics: Impacts

Extramural funding



Publications and Presentations, since 2010

- Published > 140 papers in peer-reviewed journals. (including *Nature*, *Nature Biotech*, *Nature Genet*, *Science*...)
- >10 book chapters
- Over 100 invited presentations
- ~10 utility patents/patent disclosures

Soybean Variety and Germplasm Releases

- Released 12 soybean varieties
 - UGA Roundup Ready[®] dominate soybean production in the lower southeastern United States.
- Released 27 soybean germplasm with unique traits
 - widely used by private companies in breeding programs

Impact of UGA-developed crops

- Annual contributions of UGA varieties
 - **\$60,000,000** from seed sales
 - **\$10,000,000** from turf sales
- Number of jobs generated in GA to produce & sell seed of UGA varieties
 - **~2000**
- Annual royalties to UGA
 - **~\$4 million**





WSRC
2017 **10**



SAVANNAH
GEORGIA
USA

CELEBRATING 250 YEARS
OF SOYBEAN IN NORTH AMERICA

World Soybean Research Conference 10

September 10-16, 2017 • Savannah, Georgia, USA

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