



- ❖ A publicly initiated and led research initiative to catalyze and coordinate research linking genomics and predictive phenomics to achieve advances that generate economical and societal benefits
- ❖ Goal is to develop knowledge, tools and technologies that create crop varieties that are more resilient and better adapted to current and future variable weather patterns
- ❖ G2F has developed a flexible and distributed infrastructure that can adjust to address emerging problems
- ❖ Working at a scale that instigates interest from interdisciplinary collaborators way beyond the plant sciences

**[www.Genomes2Fields.org](http://www.Genomes2Fields.org)**

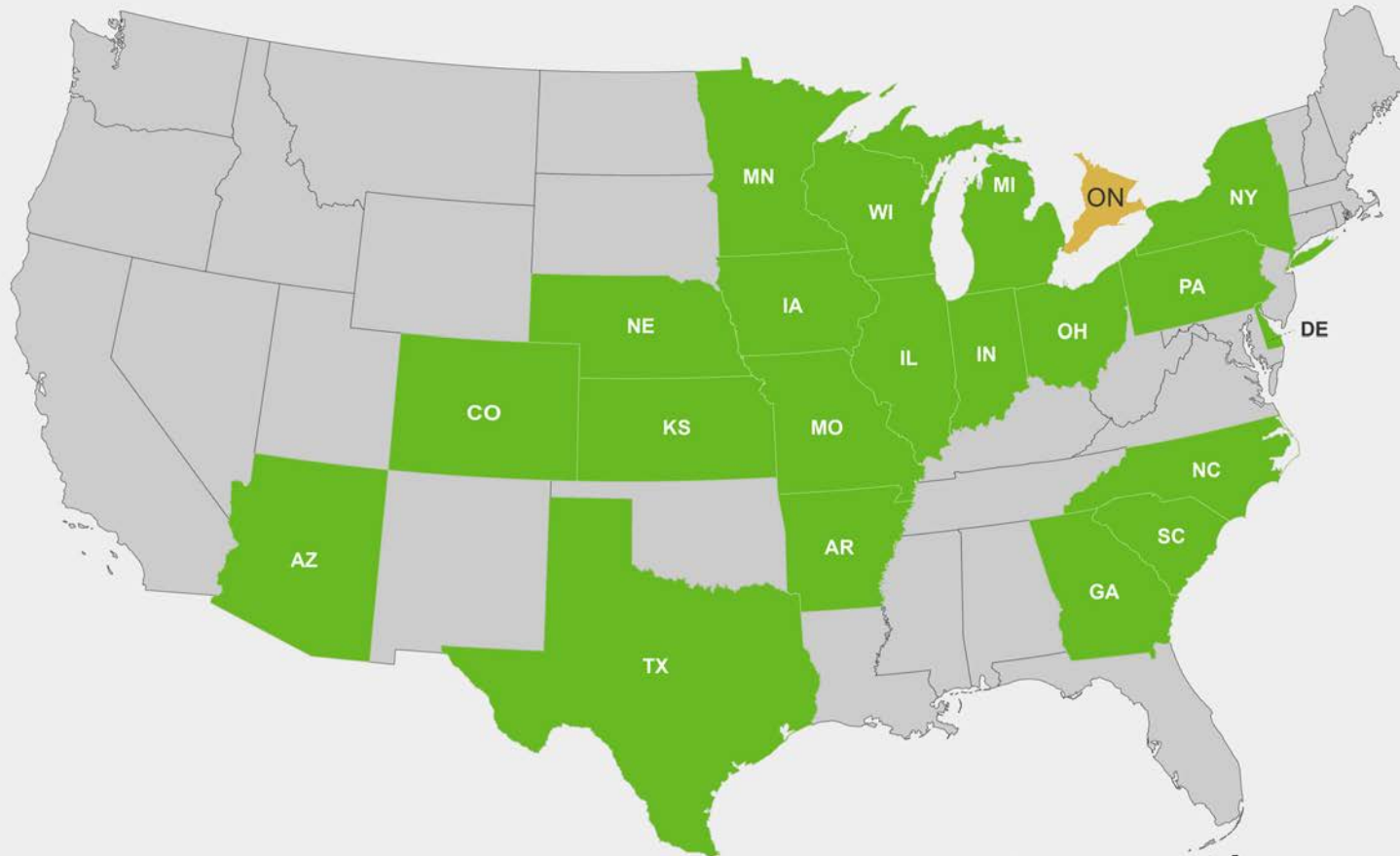
## 2018 Academic & Federal Institutions

Arkansas State University  
Clemson University  
Colorado State University  
Cornell University  
Iowa State University  
Kansas State University

Michigan State University  
North Carolina State University  
Ohio State University  
Pennsylvania State University  
Purdue University  
Texas A&M University

University of Arizona  
University of Delaware  
University of Georgia  
University of Guelph  
University of Illinois  
University of Minnesota

University of Missouri  
University of Nebraska  
University of Wisconsin  
USDA-ARS



2018 GxE Principal Investigators and Academic & Federal Institutions in the United States and Canada

## SINCE 2014:

- ❖ 146 unique environments
- ❖ ~100,000 plots
- ❖ ~3,500 unique varieties (with genetic sequence)
- ❖ 21 States
- ❖ 32 scientists
- ❖ 5 years of data
- ❖ Data are being made public

## G2F Scale and Scope:

Year	2014	2015	2016	2017	2018
No. of trials	23	28	40	43	42
No. of unique locations	19	24	34	38	31
No. of states/provinces	13	16	19	23	22
No. of principal investigators	19	25	29	32	28
No. of plots	12,678	13,650	19,360	21,186	27,298
No of unique inbreds:	380	553	313	295	295



# Traits Measured in G2F:

## Yield



## When Plants Flower



## Agronomic Characteristics



## Size and Shape





# Developing and Deploying New Technologies:

- ❖ Need ways to efficiently do thousands of measurements instantaneously
- ❖ Measure traits throughout the day and season
- ❖ Need ways to measure traits we currently cannot observe

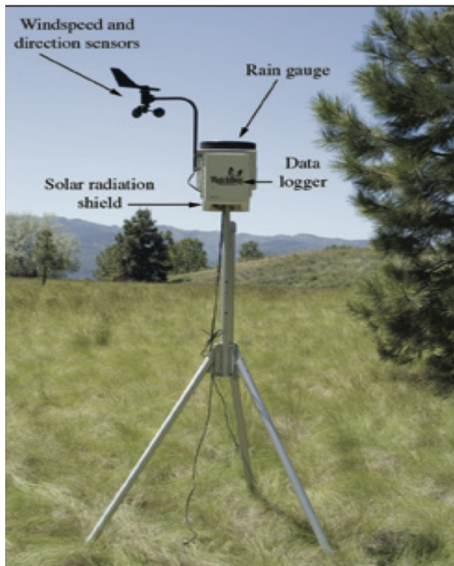


# Weather Data:

- ❖ Wind Speed and Direction
- ❖ Precipitation/Rainfall
- ❖ Solar Radiation
- ❖ Soil Moisture and Temperature

Main Weather Station

MicroStation



# Soil Data:

- ❖ Soil Texture
- ❖ Soil Composition: %Sand, Silt, and Clay
- ❖ Soil PH
- ❖ N, K, Zn, Fe, Mn, Cu, Ca, Na levels



# MetaData:

- ❖ Experiment Information
- ❖ Weather Station Information
- ❖ Plot Layout and Planter Information
- ❖ Agronomic Information

# Initial Findings:

- ❖ The genetic variability that originally contributed to the adaptation of corn to North America may now limit the ability of modern varieties to adapt to different environments (Published in Nature Communications 8(1): 1348)



# Data Is Made Publicly Available:

[Home](#)[About](#)[Funded Projects](#)[Publications](#)[Meetings](#)[Resources](#)[›Ear Imaging Data](#)[›Data Downlads](#)[›Standard Operating Procedures \(SOP\)](#)[›Newsletters](#)

- › 2018-12-31
- › 2018-07-18
- › 2017-08-11
- › 2017-04-10
- › 2016-06-21

[›Genomes2Fields Links](#)[›Genomes2Fields Logos & Images](#)[›Photos & Videos](#)

## Data Downloads

Field Season	Release to Collaborators (ARK)	Release to Public (DOI)
2014	Not Available	<a href="https://doi.org/10.7946/P2V888">https://doi.org/10.7946/P2V888</a>
2015	February 2017	<a href="https://doi.org/10.7946/P24S31">https://doi.org/10.7946/P24S31</a>
2016	February 2017	<a href="https://doi.org/10.7946/P3MW27">https://doi.org/10.7946/P3MW27</a>
2017	February 2018	March 2019
N	February of N+1	March of N+2

❗ Please report data errors or inconsistencies that you might identify [using this submission form](#)

**2016 Field Season (Available to Public):** Phenotypic, genotypic, and environment data for the 2016 field season: <https://doi.org/10.7946/P3MW27>

**2015 Field Season (Available to Public):** Phenotypic, genotypic, and environment data for the 2015 field season: <https://doi.org/10.7946/P24S31>

**2014 Field Season (Available to Public):** Phenotypic, genotypic, and environment data for the 2014 field season: <https://doi.org/10.7946/P2V888>



# G2F Cooperators

- Timothy Beissinger (George-August)
- Martin Bohn (UIUC)
- Ed Buckler (USDA-ARS)
- Darwin Campbell (ISU)
- Ignacio Ciampitti (KSU)
- Natalia de Leon (UW)
- Liang Dong (ISU)
- Jode Edwards (USDA-ARS)
- David Ertl (IA Corn)
- Sherry Flint-Garcia (USDA-ARS)
- Jack Gardiner (ISU)
- Fiona Goggin (A-State)
- Mike Gore (Cornell)
- Christopher Graham (SDSU)
- Candy Hirsch (UMN)
- Jim Holland (USDA-ARS)
- Elizabeth Hood (A-State)
- David Hooker (Guelph)
- Diego Jarquin (UNL)
- Shawn Kaeppler (UW)
- Joe Knoll (USDA-ARS)
- Judith Kolkman (Cornell)
- Greg Kruger (UNL)
- Nick Lauter (USDA-ARS)
- Carolyn Lawrence-Dill (ISU)
- Liz Lee (Guelph)
- Sanzhen Liu (KSU)
- Argelia Lorence (A-State)
- Aaron Lorenz (UMN)
- Jonathan Lynch (PSU)
- Steve Moose (UIUC)
- Seth Murray (TAMU)
- Rebecca Nelson (Cornell)
- Christine Poudyal (UMN)
- Torbert Rocheford (Purdue)
- Oscar Rodriguez (UNL)
- Cinta Romay (Cornell)
- James Schnable (UNL)
- Pat Schnable (ISU)
- Brian Scully (USDA-ARS)
- Rajandeep Sekhon (Clemson)
- Kevin Silverstein (UMN)
- Maninder Singh (MSU)
- Margaret Smith (Cornell)
- Edgar Spalding (UW)
- Nathan Springer (UMN)
- Srikant Srinivasan (ISU)
- Kurt Thelen (MSU)
- Peter Thomison (OSU)
- Addie Thompson (MSU)
- Mitch Tuinstra (Purdue)
- Jason Wallace (UGA)
- Rick Ward (UofA)
- Rod Williamson (IA Corn)
- Randy Wisser (UDel)
- Wenwei Xu (TAMU)
- Jianming Yu (ISU)



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United States Department of Agriculture  
National Institute of Food and Agriculture

