

# Connecting the Data: WHIN's Ecosystem Goes Full Circle

## WHIN launches it's data portal

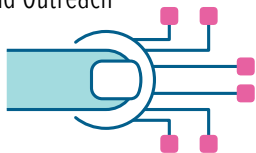
The concept behind WHIN's Alliance model is simple: accelerate the adoption of a common set of IoT technologies in a living lab and collect data from the use of the technology for researchers and educators. But making that data available is a technological feat in and of itself.

WHIN collects a huge amount of very diverse data. Its dense array of weather stations report temperature, humidity, solar radiation, precipitation, wind speed and direction, and soil moisture and temperature at four depths every 15 minutes—and has been doing so for over a year. Starting in the 2020 growing season, WHIN began receiving high resolution images from hundreds of thousands of acres. Also in the data lake? Data from the operation of farm equipment of 30+ Ag Alliance members.

To help researchers and educators connect with all that data, WHIN's Data Portal was launched over the summer. The portal can be used to request sample sets and to contact WHIN to arrange for specific data sets.

WHIN held its first Q&A meeting for Purdue researchers in August. Interested departments included:

- Agricultural & Biological Engineering
- Department of Food Science
- Indiana State Climate Office
- Agronomy Education and Outreach
- Computer Science
- Civil Engineering
- Agronomy
- Horticulture & Landscape Architecture
- Ag Economics
- Department of Earth, Atmospheric, and Planetary Sciences
- ITAP Research Computing
- Purdue Center for Regional Development



WHIN will continue to work with researchers to understand and meet their needs.

WHIN DATA PORTAL

HOME DATA ABOUT ACCOUNT

# WHIN

D A T A

The largest agricultural & manufacturing Living Laboratory in the country, now easily accessible for academic research.

The WHIN living lab covers a 10-county region, the "Wabash Heartland" of Indiana, comprising over 4,300 square miles. WHIN's expansive network of internet-connected sensors are fueling a growing ecosystem of technology-enabled farms and factories.

WHIN serves its charitable purpose by aggregating and disseminating data it obtains under license from operational network, sensor, and other technology related to the Internet of Things and installed with the assistance of WHIN in the living lab region. WHIN's data has particular educational and research value because:

- It comes from real farm and manufacturing operations.
- The technology that generates the data is replicated throughout the living lab, providing consistent, structured data sets.
- The living lab is very large, extending across ten counties.

*Digital technology, pervasively, is getting embedded in every place: every thing, every person, every walk of life is being fundamentally shaped by digital technology — it is happening in our homes, our work, our places of entertainment. It's amazing to think of a world as a computer. I think that's the right metaphor for us as we go forward.*

— Satya Nadella, CEO of Microsoft

WHIN DATA PORTAL

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WHIN Data / Weather API

## Weather Station Data API

[API ACCESS](#) | [CSV OR JSON FORMAT](#) | [140+ WEATHER STATIONS](#)

Wabash Heartland Innovation Network is deploying hundreds of weather stations across our region and sharing information our farmers can use to become more efficient, save time, and increase yields. We're on our way to making the densest agricultural weather network in the country.

- Uniform deployment of hardware across the entire living lab.
- 15 minute interval reporting
- Surface temperature and humidity.
- Wind speed and direction, including gusts.
- Soil temperature and moisture at 4 depths.
- Solar radiation.
- Tipping rain bucket measuring 1/100" increments.

### License

WHIN is granting access to 20+ public-facing weather station data for educational purposes. The license is valid for one year and is free of charge as long as the data is used solely for instruction and learning.

### Sample Data

One full month worth of sample data from over 140 weather stations is available free of charge to educators, students, and researchers.

To license a larger time period or get ongoing access to the WHIN weather network, please [contact us](#).

[Download Sample Data](#)

This sample data is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

### Data Format

The Weather API returns a uniform record format of each weather observation for both historical and current conditions data.

Name	Description	Key	Units	Example
Observation Time	The date and time of the end of the 15-minute reporting interval	observation_time	UTC ISO 8601	2020-05-22T16:15:00Z
Station Name	The human-readable name of the weather station	station_name	N/A	Pedestrian Bridge
Station Latitude	The latitude of the weather station	latitude	decimal degrees	40.42919
Station Longitude	The longitude of the position	longitude	decimal degrees	-86.84547
Average Temperature	Average surface temperature over the time interval	temperature	Degrees F	30

## Connecting the Data: WHIN's Ecosystem Goes Full Circle *(Cont'd)*

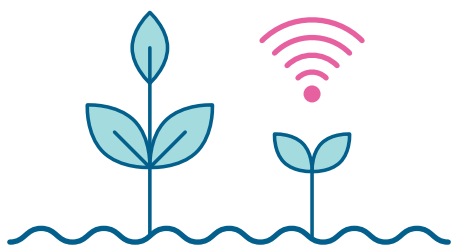
### ... and finds an educational partner in Purdue's Data Mine

A very important stakeholder in WHIN's data lake is educators, and Purdue has made data literacy a campus-wide priority. The idea is to prepare students in every discipline to have a working knowledge of data analytics that will give them an edge in the job market. The initiative recognizes that, thanks to IoT, the world is getting smarter. There is, therefore, a growing need for workers who have not only traditional job skills, but who also can extract new knowledge from the enormous amount of data IoT generates.

But for 600 undergraduate students in Purdue's Data Mine learning community, becoming data fluent is a 24/7 immersion experience. Data Mine students live together in Hillenbrand Hall and work together on collaborative, interdisciplinary projects developed for them by corporate and campus partners who give them access to real world data and guide them through solving specific problems with the data.

In the Fall 2020, semester, WHIN joined Bayer Crop Science, Beck's, CAT Digital, Cummins, Delta Faucet, Elanco, Ford, Jobvite, John Deere, Kraft-Heinz, Lawrence-Livermore National Laboratories, Merck, Microsoft Minecraft, MITRE, OneAmerica, Rolls-Royce, Sandia National Laboratories, TMap, UPS, and Viasat as a corporate partner. WHIN's data is well-suited for classroom projects.

The partnership developed after Data Mine Director and professor of Statistics, Dr. Mark Ward, invited Johnny and Jack to present to students last spring. Jack asked how many of the 70 students present knew that agriculture includes data and cutting-edge technology. Two raised their hands. By the end of the presentation, all 70 let Jack know they got it: a career in agriculture had become an exciting new option for these data-minded students.



Data Mine students in a seminar class.



Locating a WHIN weather station at Hillenbrand Hall.