

If not for WHIN...

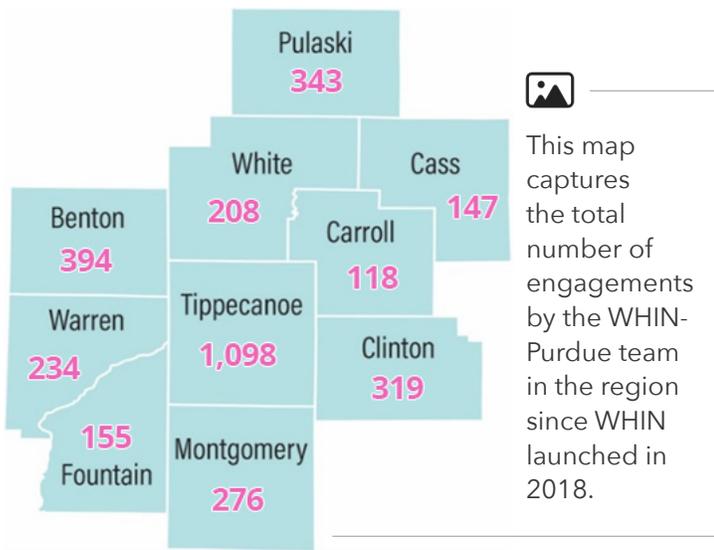
Regional Engagement

These are the innovations, networks, and initiatives that exist now in the Wabash Heartland Region that did not exist before WHIN.

▼ INNOVATIONS

These are the ideas and products that exist now in the Wabash Heartland that did not exist before WHIN.

Living Lab



Bio Town Ag is a progressive farm operation in White County. In May 2019, WHIN-Purdue researchers and students deployed commercial vibration sensors that monitor six motors in Bio Town Ag’s energy center. IoT-enabled sensing also monitors Bio Town Ag’s crops and livestock, incorporating real-time detection of performance on the farm. Purdue Extension Digital Agriculture Specialist John Scott has also assisted the Furrers, who own Bio Town Ag, with the use of drones for their cattle operation to detect numbers of cattle on feed and other production indicators. All of these real-world projects are bringing the research of the university to the farms and fields of WHIN region residents. “I love it when we (the IoT Infrastructure & Data Analytics team) visit one



of the counties, and a farmer or manufacturer responds by saying: ‘Wow! I could really use this!’ said Charilaos “Harris” Mousoulis. “Knowing that there’s an application for our work is the best part.”



“We are watching the data that will help make informed farm management decisions. We believe this innovation can help save tons of nutrients in terms of ecological impacts, as well as perhaps tens of thousands of dollars per year per farmer.”

Leslie Fisher
Resource Conservation Specialist



In April 2020, the Purdue-WHIN team began partnering with farmers in the Wabash Heartland region to use cutting-edge sensors as an innovation solution on four farms in Benton, Fountain and Warren counties. The team’s

sensors measure nitrate levels in field drainage tiles and soil data for the volume of water in soil, along with soil temperature and humidity. All of these are very valuable metrics to farmers because fertilizing and hydrating a farm are both expensive, and the weather greatly affects both.

Through this project, participating farmers provide Purdue-WHIN access to their farm and, ultimately, data that improves their sensors. In return, Purdue-WHIN is providing the participating farmers with a personalized, user-friendly interface that helps the farmers accurately gauge their individual field's nitrate, soil moisture and temperature levels, and other pertinent data.



WHIN-Purdue research improves conditions in Wabash Heartland farrow barns.

Professor Robert Stwalley and graduate student Tyler Field are making the lives of pig moms a little easier and the business of pork production more profitable. Sow metabolism has increased up to 80% as a result of selective breeding for higher production. Sows easily overheat, causing stress and a reduction in milk projection, among other problems. Dr. Robert Stwalley and Dr. Alan Schinkel have developed a patent-pending cooling pad that provides welcome relief to sows while allowing farrow barn temperatures to remain in the 90s for the welfare of piglets.



Purdue Graduate Student and project leader, Trevor Mamer, works with his hardware teammates to encase and install the sensors in Ivy Tech's field laboratory.

In Fall 2018, 17 graduate students in Tony Smith's computer and information technology course at Purdue partnered with faculty and administration at Ivy Tech to tackle a WHIN digital agriculture project. The goal of the project was to create a sensor communication system consisting of currently available IoT devices, technologies, and practices to measure soil moisture, temperature, and

weather conditions. "The students were successful in collecting the data and utilizing their problem-solving skills to initiate the first IoT sensor data collection on the Ivy Tech campus," said WHIN-Ivy Tech Manager, Chad Martin. The beta test helped Ivy Tech identify potential challenges with the field laboratory, such as the need for a sustainable power source for the sensors; solar is being investigated. "We are finding ways to involve Ivy Tech students so they can be involved in set up and maintenance of the sensors, as well as the end-to-end system," explained Martin.

Regional Cultivation Fund



Two of WHIN's Round 1 Regional Cultivation Fund (RCF) grantees have used WHIN's financial support (totaling \$114,663.35) to bring agriculture innovation to their classrooms.



Frontier School Corporation turned FFA land plots managed by partner school districts into digital agriculture testbeds and living labs for students, area farmers, and agriculture businesses to experiment with data collection in practice.

MSD of Warren County School Corporation created a Department of Education-approved, dual-credit precision agriculture course and externship program offered to juniors and seniors—and shared the curriculum with all Wabash Heartland schools via a train-the-trainer model.

▼ NETWORKS

These are the discussion groups, alliances, and portals that exist now in the Wabash Heartland that did not exist before WHIN.

Wabash Heartland Region LEDOs

Since the beginning of the WHIN effort, LEDOs (local economic development officials) have been instrumental in helping connect regional small- to medium-sized enterprises (manufacturers) and agriculture businesses (farmers, co-ops and retailers) with Purdue faculty and staff working on WHIN-related projects. LEDOs have utilized the DSCT (digital supply chain tool) for economic development, leveraged business-to-business relationships, and collaboratively reduced regional supply chain leakage.

At the invitation of the region's LEDOs, the WHIN-Purdue team has consistently engaged with established networking groups in the region, such as those standing meetings in Clinton, Fountain, Montgomery, Pulaski and Warren counties. In the other counties (including Benton, Carroll, Cass, Tippecanoe and White counties), LEDOs have been instrumental in facilitating conversations with industry and community leaders.

Ivy Tech & Purdue Collaboration



WHIN can claim success for encouraging unique collaboration opportunities among Ivy Tech and Purdue University for the Lafayette regional campus. Several examples include deployment of agriculture sensors and data collection, sharing Ivy Tech non-credit education offerings in partnership with the Krannert DCMME team on their Education Portal, and working closely with IMI and IN-Mac on training opportunities and sensor demonstrations together. Additionally, pursuing external funding opportunities among the two institutions has added value to the WHIN investments in the region.

Regional Cultivation Fund



Four of WHIN's Round 1 and Round 2 Regional Cultivation Fund (RCF) grantees have used WHIN's financial support (totaling \$1,472,279) to enhance regional connectivity and networking in a variety of different ways.

The North Central Indiana Regional Planning Council (NCIRPC) engaged Watch Communications to identify infrastructure needs within the 10-county region. Together, they designed a unified regional network of fixed wireless and fiber infrastructure via collaboration with local Internet Service Providers (ISPs). Their goal was to enable broadband coverage to 80% of WHIN Region, specifically in rural areas, while building at least one IoT Beta site in cooperation with regional LEDOs.

The Indiana Recycling Coalition (IRC) analyzed existing regional infrastructure for recycling collection (including processing & education) in partnership with local solid waste management districts and Purdue Environmental and Ecological Engineering. IRC produced an infrastructure inventory and use-case for sensors/IoT to increase system/cost efficiency.

The Wabash River Enhancement Corporation (WREC) successfully developed a five-county Wabash River Greenway Corridor master plan that, with follow-on funding granted by WHIN in Round 2 and other donors (such as North Central Health Services, Western Indiana Community Foundation, and Warren County Community Foundation), will eventually connect trails throughout the entire 10-county region along the 90-mile Wabash river corridor.

The Eleven Fifty Academy (Eleven-Fifty), a Fishers-based educational center, offers coding immersion training programs, or coding “boot camps,” to help anyone who wants to quickly launch a technology career. Eleven-Fifty is a Registered Software Development Apprenticeship program and also accepts GI Bill® Funds for transitioning veterans. With over 1,000 placements to date, Eleven-Fifty is meeting a critical workforce need for Indiana employers while reducing barriers to career entry. The goal of the planning grant, funded by WHIN, was to allow Eleven Fifty to partner with corporations, Chambers of Commerce, school corporations, and other agencies in the WHIN region to identify the region’s specific coding program needs.

Community Foundation. Among the key findings were these: 1) residents ranked parks and trails as their No. 1 community asset under vitality, 2) residents selected workforce and education alignment as their No. 1 priority under education, and 3) residents picked community-wide, high-speed internet as their No. 1 prioritized improvement under connectivity.

Between Aug. 10 and Oct. 10, 2020, Wabash Heartland region residents responded to WHIN’s COVID-19 Impact: Internet, E-Learning and Remote Work Survey (produced by the Purdue Center for Regional Development and commissioned by WHIN), which asked questions about navigating technology during the pandemic. One interesting finding was that 50% of the respondents rented from, or were provided their child’s or children’s remote device/devices by a school, church, library or other community organization. This finding speaks to the need that exists for families to use devices provided by the school and share those devices among family members. These results were gathered to inform WHIN’s e-Learning Regional Cultivation Fund initiative.

▼ INITIATIVES

These are the projects, trainings, and degree-seeking courses that exist now in the Wabash Heartland that did not exist before WHIN.

Placemaking Survey



 WHIN team members attended all 10 county fairs to promote WHIN’s Placemaking survey answered by nearly 4,000 total respondents in person and online.

The Purdue Center for Regional Development surveyed 4,000 regional residents in the summers of 2018 and 2019 to discover their priorities for investing the Regional Cultivation Fund resources in education, vitality and connectivity. Three reports analyzing the results of the regional placemaking survey gave an overview of the feedback from all (10) WHIN region county fairs and the online survey responses—and were delivered as customized version to each county’s

Regional Cultivation Fund



 Three of WHIN’s Round 1 and Round 2 Regional Cultivation Fund (RCF) grantees have used WHIN’s financial support (totaling \$1,447,545) to launch significant regional initiatives in all 10 counties.

Indiana West Advantage (IWA) in conjunction with Ivy Tech conducted a regional survey of agricultural businesses and producers to analyze the skills that are necessary in the precision agriculture industry. Based on the results of this survey, they were awarded a Round 2 grant to 1) construct and equip a precision agriculture

the results of this survey, they were awarded a Round 2 grant to 1) construct and equip a precision agriculture laboratory and hire faculty, 2) purchase a mobile precision agriculture demonstration vehicle that travels to high schools throughout the region, and 3) credential high school agriculture teachers to offer dual-credit classes/ provide communities training for the new program.

Tecumseh Area Partnership (TAP), Inc., expanded capacity of the region to offer hands-on, K-12 STEM education, teaching skills and knowledge related to additive manufacturing, prototyping, IoT technologies, programming, robotics, logistics, design, and electronics. TAP's goal was to change the perception of manufacturing careers by exposing students to popular educational programs such as Manufacturing Week, Coder Dojos, Design & Innovation Studios, and Robotics Camp.

The Tippecanoe Arts Federation (TAF) developed a region-wide public art project through community collaboration. TAF's project, titled WHIN Walls, commissioned community-themed pieces of art and placed them in prominent locations in each of the 10 WHIN counties.



▲ WHITE COUNTY



▲ CLINTON COUNTY



▲ TIPPECANOE COUNTY



Mural Progress

So far, murals have been completed in Cass, Clinton, Pulaski, Tippecanoe and White counties.



**PURDUE
UNIVERSITY**

Center for Regional Development



WABASH HEARTLAND
INNOVATION NETWORK

The Purdue Center for Regional Development (PCRD) has been involved in the Wabash Heartland Innovation Network (WHIN) since 2016 as the research/assessment component of the project. PCRD has provided WHIN with grant-writing assistance, a comprehensive data dashboard, regional placemaking surveys, biannual reports, and this midpoint impact analysis.



pcrd.purdue.edu



pcrd-web@gmail.com