



DR. XIN QIAO

IRRIGATION MANAGEMENT SPECIALIST

PROFILE

Dr. Qiao began working at the Panhandle Research and Extension Center in 2017. His research focuses on irrigation management strategies for crops that are irrigated with center pivot, furrow, or subsurface drip irrigation systems. The key goal of his research is to provide tools to help farmers and stakeholders to maximize crop water productivity and reduce potential environmental impact especially on water quality.

CONTACT

PHONE:
308 – 632 – 1240

EMAIL:
Xin.qiao@unl.edu



An interactive Internet of Things (IoT) research and extension network

The tunnel collapse happened back in July 2019 was one of the many great challenges faced by farmers in western Nebraska. It was also a great challenge to me, who was asked to predict potential yield loss for 55,000 acres of farmland, without knowing their soil types, irrigation/rainfall records, cropping history, and etc. One way to get us better prepared for such unprecedented situations is to have a network that can provide historical and in-season data of the particular fields. Therefore, we started to build a research and extension network that features sensors, low-cost telemetry, and in-house designed visualization platform (website at this moment, <https://phrec-irrigation.com>). Real-time sensor data together with in-field scouting have assisted farmers in irrigation scheduling at different crop growth stages. It also allows researchers and extension educators to be able to quickly identify possible problems and give more accurate suggestions. Also, farmers can view sensor data at our research plots during the full growing season. In 2020, we have 7 farmer fields in our network, and we expect to continue expanding in the future. Our ultimate goal is to build an interactive-learning research and extension network that can advance crop irrigation management and make us more prepared and resilient to different scenarios.

Disease monitoring network for sugar beet and dry edible beans

In working with PHREC plant pathologist Dr. Bob Harveson, we are building disease monitoring networks for cercospora leaf spot (CLS) in sugar beet and white mold in dry beans. The two networks use already existing algorithm/tables and are transformed into real-time data using temperature and relative humidity sensor, low-cost telemetry, and cloud computing. The CLS monitoring network has been accomplished and have been posted [online](#). The white mold monitoring network is still under construction.

An artificial intelligence-based flow meter reading recognition algorithm

In this project, our goal is to develop an advanced image recognition algorithm that can be used for flow meter readings recognition. Such technology can be integrated into our IoT network to provide NRDs real-time flow meter data from ground water wells at a significantly lower communication cost compared to traditional telemetries. In 2020, our current algorithm can recognize flow meter readings with over 90% accuracy for over 3000 tested pictures. We are confident that the accuracy can be further improved by taking pictures in a more controlled environment.