Irrigation Innovation Consortium

Accelerating and leveraging technology to improve energy and water efficiency.
Irrigation Innovation Consortium

- A Consortium of Higher Education, Industry, and NGOs
  - Colorado State; Fresno State; Kansas State; Nebraska; Texas A&M
  - Focusing on technology development and filling research gaps through demonstration and training in a pre-competitive space

- Major Research Themes
  - Water and Energy Efficiency
  - Remote Sensing and Big Data Applications for Improving Irrigation Water Management
  - System Integration and Management
  - Irrigation Technology Acceleration

- Initial Budget of $10M ($5M investment from FFAR matched with private support)

Mission & Vision of the Irrigation Innovation Consortium
IIC will accelerate the development and adoption of novel water and energy efficient irrigation technologies and practices through public-private partnerships. IIC will expand to include more universities and public sector researchers to create an internationally recognized, neural network center of excellence that promotes and enhances water and energy efficiency in irrigation, ultimately creating greater resiliency in our food and irrigated landscape systems.

Geographic depth and breadth, covering landscape and agriculture. The consortium will be based at Colorado State’s Irrigation Technology Center, a 50 acre site in Fort Collins, but research demonstration sites will be located in many regions.
IIC Executive Director
Dr. Jay Ham
Purpose and goals of IIC

- Develop state-of-the-art instrumented locations to showcase current irrigation technologies (hardware, software, sensors, and management systems)
- Provide hands on training in the use of new irrigation technologies for diverse clientele – field days, short courses, distance education and semester long graduate and undergraduate courses
- Provide on-site evaluation of irrigation systems and technology
- Provide education and workshops
- Provide a clearinghouse for irrigation technology
- Provide training and outreach to irrigated crop producers
Purpose and goals (continued)

- Develop certification training and continuing education for professional irrigation practitioners
- Use instrumented hydraulic labs to certify and test gates, water meters, and sensors, and as a training/demonstration site for industry practitioners
- Develop and train the next generation of irrigation engineers and water managers
- Conduct white space research and gap research within FFAR objectives
- Collaboration potential (via a FFAR sponsored Consortium) between multiple universities, industry, and irrigators
Scope of the Consortium

- Agriculture and landscape focus on efficient and managed irrigation (recognizing suitable overlap in these two industry segments)
- Central Plains, National, International
- Research, demonstration, and training
- Certification testing
- Pressurized irrigation methods and installations for demonstration and evaluations
- Pressurized irrigation research
Field Scale Technologies
Landscape System Technologies
Open Channel and Pressurized Conveyance Systems
Technology Testing, Certification and Validation
Research Theme
Water and Energy Efficiency

Future Farm: Farm-Scale Management

Computation Module
Electric Module
Hydraulic Module
Irrigation Module

Data Acquisition Module

Field-Level Operational Tools
- Plant Stress
- Remote Sensors
- Soil Moisture
- Aerial Imaging

Irrigation Planning Tools
- Water Source Data
- Water Loss
- Pressure Sensors
- Flow Meters
- Electric Meters
Research Theme
Remote Sensing & Big Data Applications for Improving Irrigation Water Management
Research Theme
System Integration and Management

- There are many valid reasons producers do not adopt new technologies.
- Industry is asking producers and ditch companies to invest significant resources in technology upgrades.
- How will technology increase profits, save labor, save water?
- How can individual technologies be effectively integrated into existing irrigated systems?
Research Theme
Irrigation Technology Acceleration
CSU Irrigation Innovation Center

I-25 and Prospect Site
CSU Irrigation Innovation Center

Develop, Educate, Demonstrate and Evaluate
Irrigation technology and management, including:

- Irrigation Technology Innovations for Ag and Hort applications
- Irrigation Hydraulics
- Soil-Water-Plant Relationships
- Estimation of Evapotranspiration
- Design and Evaluation of Surface, Sprinkler and Micro Irrigation
- SCADA and Remote Sensing
- Water Conveyance and Control Structures
- Drainage
- Salinity Control and Management
- Irrigation Economics
Purpose and goals of CSU Irrigation Innovation Center

- Strengthen CSU presence in irrigation engineering, science and management
- Showcase current irrigation technologies (hardware, software, sensors, and management systems)
- Provide hands-on training in the use of new irrigation technologies – field days, short courses, distance education and semester-long graduate and undergraduate courses
- Conduct research on new and irrigation systems and technology
- Use instrumented hydraulic structures to certify and test gates, water meters, and sensors, and as a training/demonstration site for industry
IIC conceptual layout
Open Channel and Pressurized Conveyance Systems
The Vision

• A network of universities collaborating with Industry

- Fresno State
- K-State
- Texas A&M Agrilife
- Water for Food Daugherty Global Institute at the University of Nebraska
- Colorado State University

• Other university participants are anticipated in phase 2.

https://irrigationinnovation.org/
IIC summary points:

• Both landscape and agriculture irrigation
• Strong university and industry collaborations
• Emphasis put on technology transfer to irrigation practitioners
• We are actively seeking input, partners and collaborations
CSU CAMPUS AT THE NATIONAL WESTERN CENTER
NATIONAL WESTERN STOCK SHOW ECONOMIC IMPACT

- More than 110-year history in Colorado
- Draws visitors from 42 states and 38 countries
- 700,000 attendees at 2018 NWSS
- Estimated $115M in annual economic impact
NWC SITE PLAN

1. RTD Transit Station
2. Brighton Blvd. – 47th to Race Court
3. South Platte Riverfront
4. New National Western Drive
5. Stock Yard/Event Center Multi-Use Space
6. Campus-Related TOD
7. New Bridges Near 48th & 51st Avenues
8. Livestock Center
9. Equestrian Center
10. CSU Animal Health Complex
11. CSU Water Building
12. Maintenance & Operations Facility
13. DRIR Rail Corridor
14. WSSA Legacy Building
15. Pedestrian Bridge
16. Underground Parking
A GLOBAL CAMPUS

- 250 acres at buildout — largest redevelopment in the U.S.
- Year-round use focused on education, research, entertainment
- Creates a new front door into downtown Denver
- A place that honors our past while looking to the future
- Bridge between rural and urban interests and communities
A LOCAL CAMPUS

- Local destination with access to the South Platte River
- Connects the campus to surrounding neighborhoods
- Anticipate generating more than 1,000 construction jobs and 6,000 long-term jobs
- Small, M/WBE Business engagement and Workforce Development programs
- Programs focused on education, outreach to surrounding neighborhoods
NATIONAL WESTERN CENTER PARTNERS

Managing entity: National Western Center Authority
CSU CAMPUS AT THE NATIONAL WESTERN CENTER

CSU Water Building
[health, water, energy, environment, food systems]

CSU Animal Health Complex
[health, water, energy, environment, food systems]

CSU Center
[health, water, energy, environment, food systems]
CSU WATER BUILDING

- Scheduled to break ground in 2020
- Collaborative innovation/incubation space
- Research and teaching labs
- Western Water Policy Institute
- Community and educational space
- Denver Water’s Compliance Lab
- Professional development
- Outdoor research and learning
CSU CENTER

• K-12 Ag Discovery Center
• Classroom and Lab Space
• Event and Performance Space
• Kitchen and Sensory Testing
• Denver Metro Extension Center
• Denver Engagement Hub
• Community Spaces
CSU ANIMAL HEALTH COMPLEX

• K-12 educational facilities and programs
• Equine sports medicine: supporting treatment for equine athletes
• Equine-Assisted Therapy as part of the Temple Grandin Equine Center
• Small Animal Community Outreach Clinic