The Future of Food & Energy:
The WSU Dairy Inspiration Center

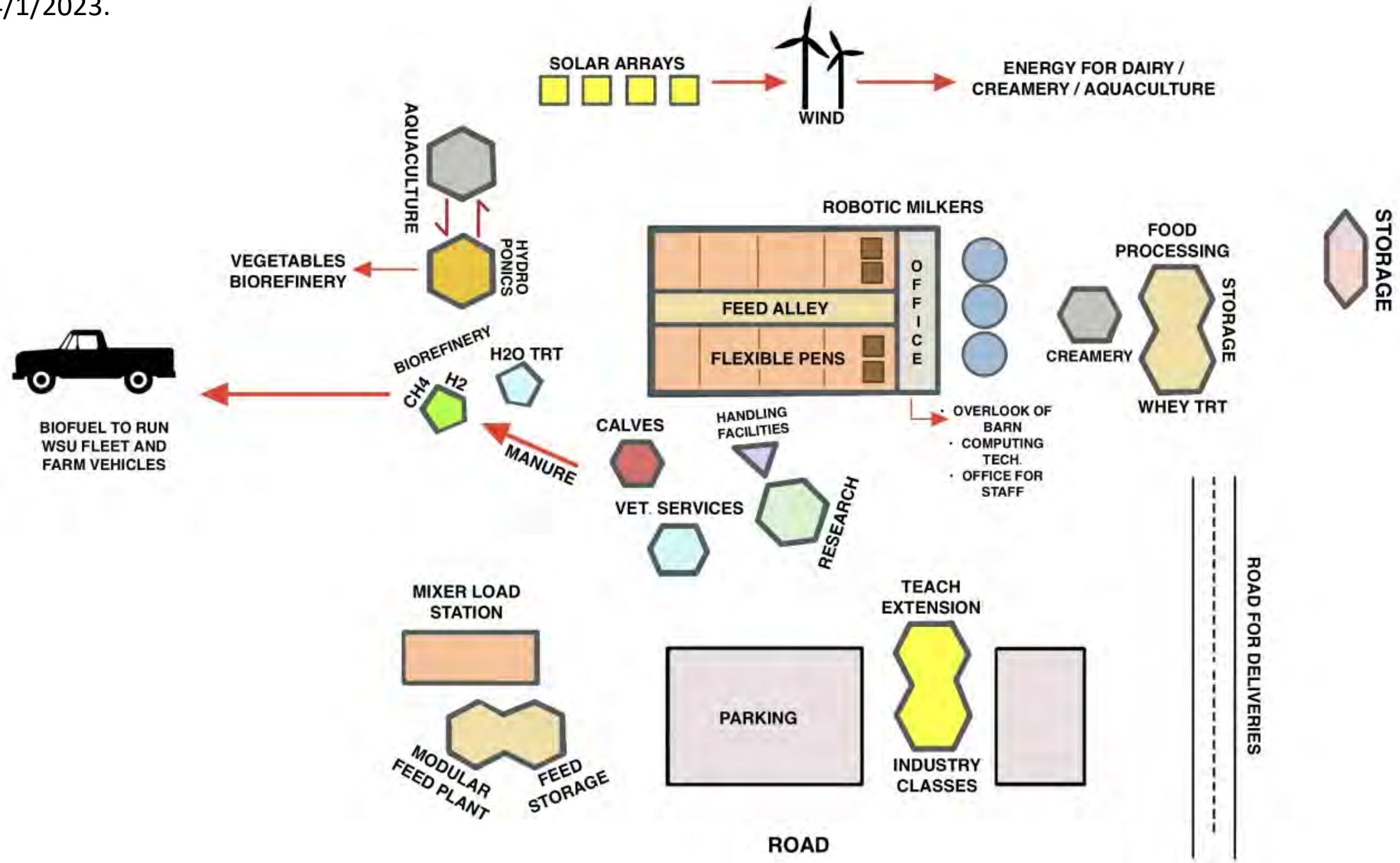
Space.com

The new “WSU Dairy Inspiration Center" will serve as a pioneering precision proving ground that will:

- **integrate cutting-edge technologies for sustainable food production,**
- **create energy,**
- **create human food,**
- **eliminate waste,**
- **upcycle university byproducts, and**
- **enhance product value by emphasizing resource efficiency, regenerative agriculture, animal welfare, and pollution reduction.**

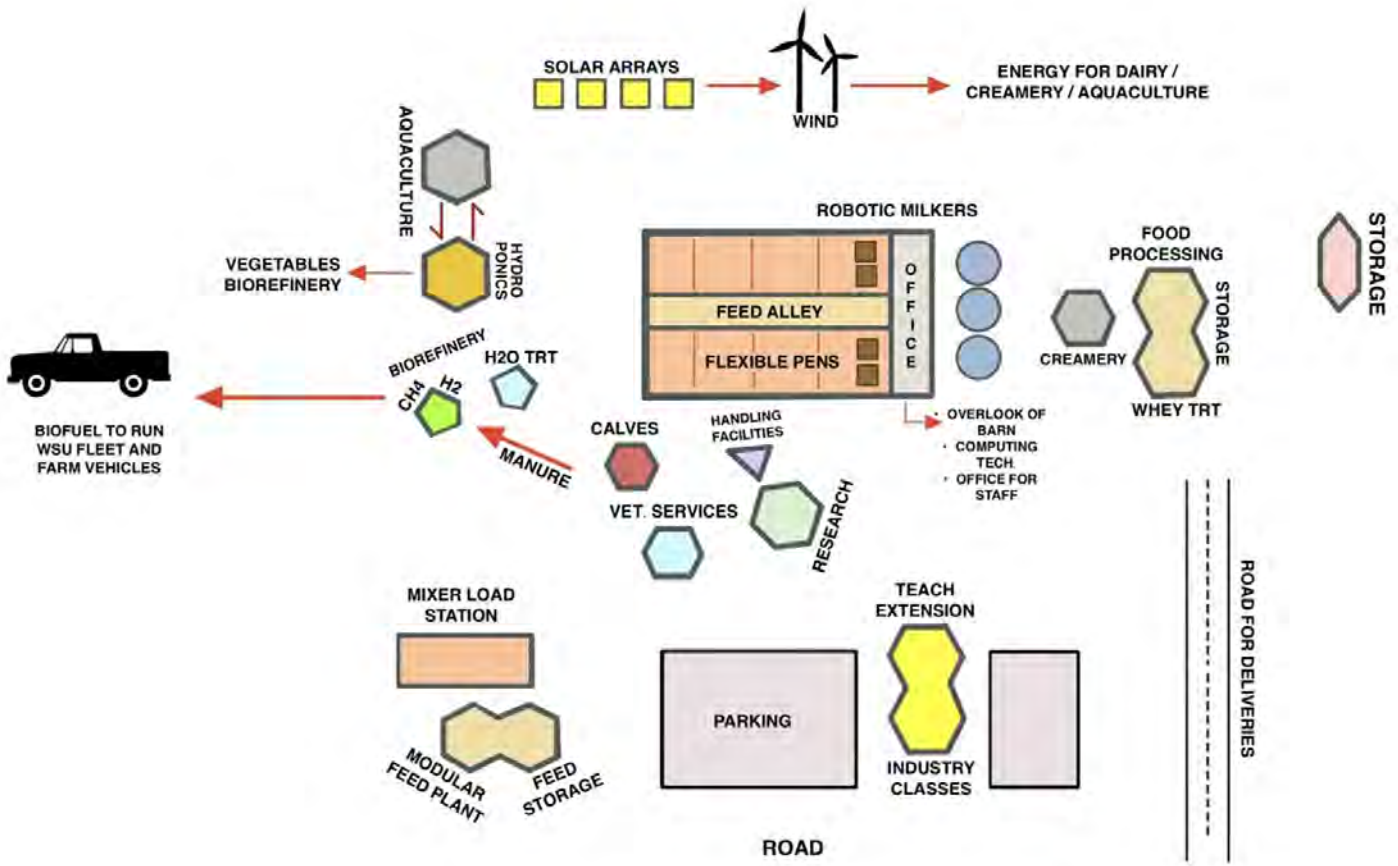
These goals will be achieved through innovative interdisciplinary research, teaching and Extension activities.

Draft: 4/1/2023.



Modular Design

- Allows the constituents to remain current
- Allow new technologies to be easily incorporated to meet teaching, research and extension needs
- Allows strategic development and design
- Allows funding plasticity for each module



Animal Housing

Geodesic dome design to house, feed, milk and manage 425 animals

250 Lactating cows- Freestall housing.

- 4 Robotic Milking Units- 65 cows/robot.
- Flexible pen design--research and teaching.
- Automated feeding and feed distribution.
- Automated manure cleaning system.

35 Dry cows-

- Open stall design--far off and transition cows.
- Maternity housing--a single milking station.

140 Replacement females ages 3 mo to 2 yr of age.

- Housing to accommodate segregation by age group
- Feeding system to provide for teaching and research needs.

- Robotic milkers
- Ventilated barn with filters
- Geodesic domes
- Automated manure removal to bioreactor

Animal Welfare

- **Cow Comfort**
  - State-of-the-art beds
  - Better cleaning capabilities

- **Improved Efficiency**
  - Less time waiting for humans

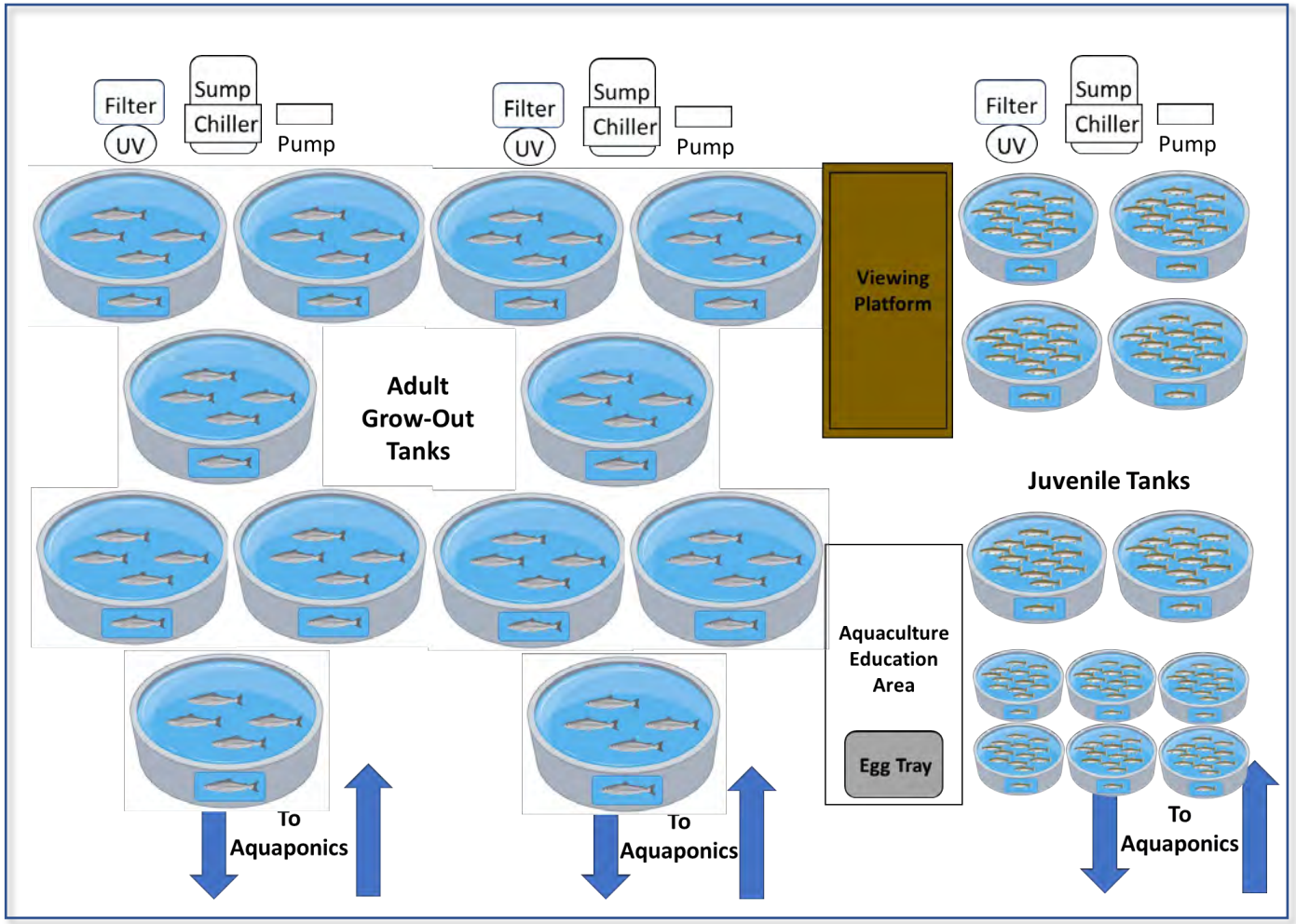
Industrialmeeting.club

- **Low-stress Handling**
  - Better cattle flow
  - Handling facilities
  - Safer handling

Dairy Research Pavilion

- New capacity to conduct needed work in areas like: nutrition, lactation, genetics, genomics, reproduction, and environmental sustainability
- Cameras
- Digestion stalls
- Environmental Chambers
- Flexible pen inside
- Flexible pens outside
- Feed preparation area
- Feed storage area
- Wet Lab
- Milking station
- Computing capacity

WSU Organic King Salmon and Integrated Agri-Aquaculture Education Center



1) Expose Students to Sustainable Aquaculture and Aquaculture Systems Design

2) Produce Unique Salmon Seafood Products for Student Led Club

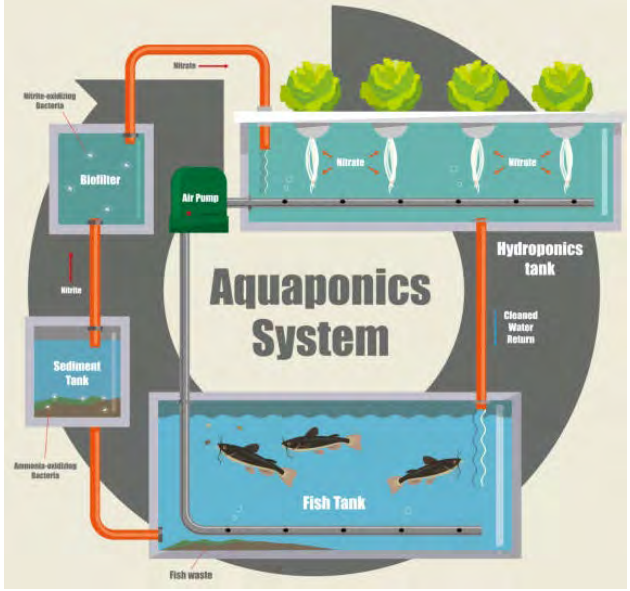
3) Open Design to Facilitate Community Outreach and Education and Future Student Recruitment

ALGAE/MICROALGAE

- Aid water treatment
- Potential Biofuel
- Capture CO2; Add O2
- Protein & Omega 3 Source

AQUA/HYDROPONICS

- Fish & Plants (Vegetables)
  - Protein & Feed
- Fish waste to plants
- Plants purify water

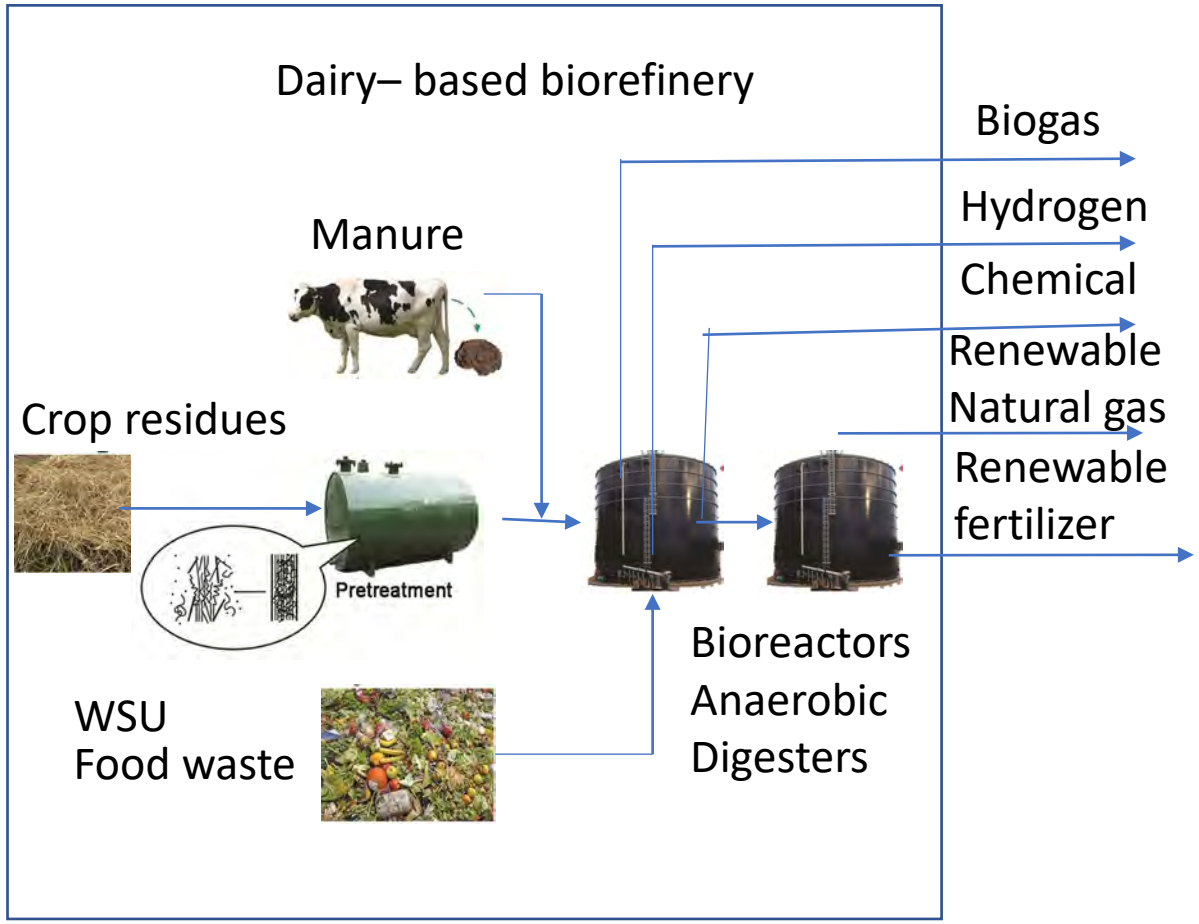


https://happyeconews.com/new-research-champions-algae-farms-as-the-future-breadbasket-of-the-global-south/

https://theaquaponicsguide.com/where-did-aquaponics-farming-come-from/

Biorefinery Demonstration/Education Unit for Next Generation of Dairy Operations

- Waste is used as feedstock to produce bioenergy and bioproducts, generating revenues instead of being a liability
- New anaerobic digestion-based technology is deployed to produce a suite of products
- Other waste types are accepted to increase the production capacity

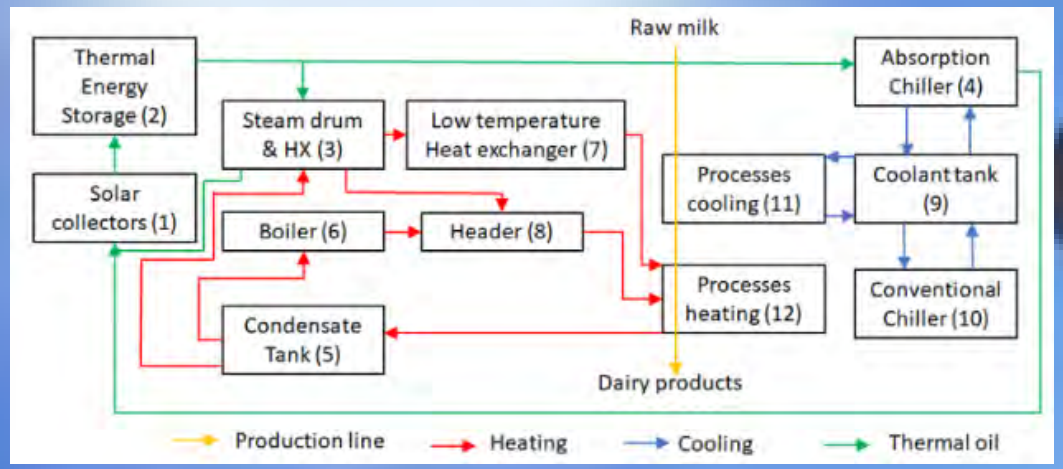


Water from dairy, bioreactor and aquaculture, creamery cleaned and completely reusable

Image: Parthenlumpprojects.com

Energy: increasing efficiency, using renewable sources and reduction in emissions

Solar energy:
Powering the dairy, aquaculture & creamery



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Dairycares.com

Modular feed plant with bulk ingredient storage

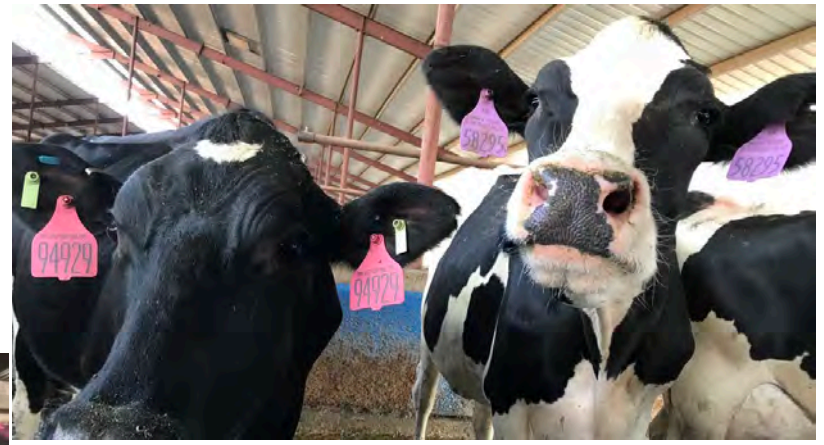
1. Serves the dairy, aquaculture, beef center, cattle lab, SOE
2. Serves research and teaching mission
3. Replaces aging infrastructure on campus
4. Power is from the wind/solar energy

Image: Auburn University

Veterinary Medicine

We are committed to advancing dairy veterinary medicine training through excellence in preventive, populational and individual medicine and herd health and wellbeing.

A veterinary ward that will utilize state of art technology and cutting-edge services for our cows and students.



Our pavilion will have:
Handling chute & table
Pharmacy
Ultrasound
Small diagnostic lab

The dairy will be dedicated to enhancing the productivity of our cows through quality herd health and quality instruction to our students and stakeholders.

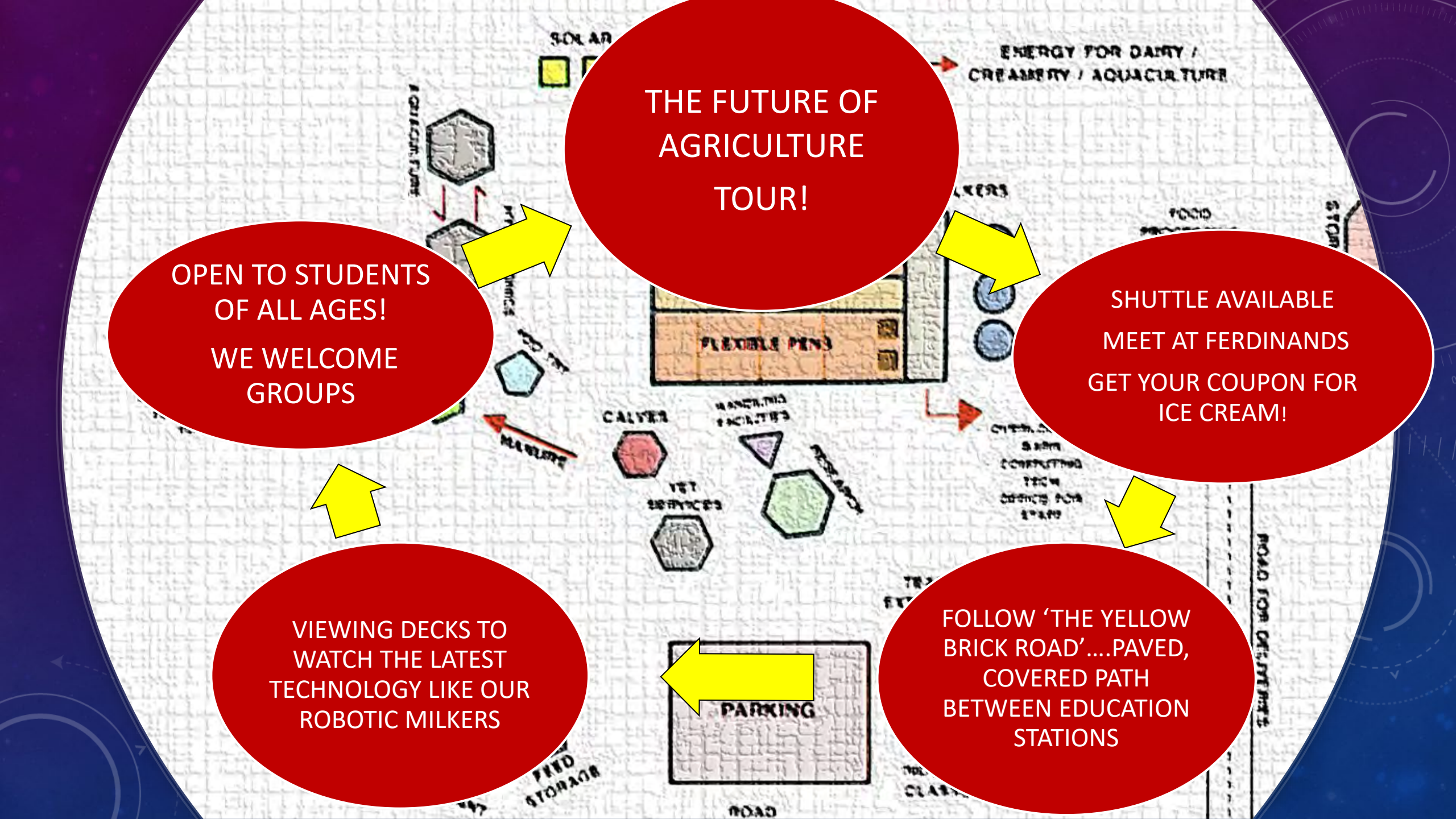
Teaching and Extension Pavilion

- **Virtual Reality Learning**
- **Community Engagement**
- **Industry Training Center**

Why the Creamery at the Farm?

- 2015 Running out of cheese first week of December
- 2017 Proposed larger cheesevat, pasteurizer and finishing table
- Several distractions and university finances held it back
- 2019 Cheese off the internet November 7
- 2019 Started picking up milk from U of I
- 2020 heading for most cheese ever then COVID 19
- Now back to 2017 proposal and/or . . .

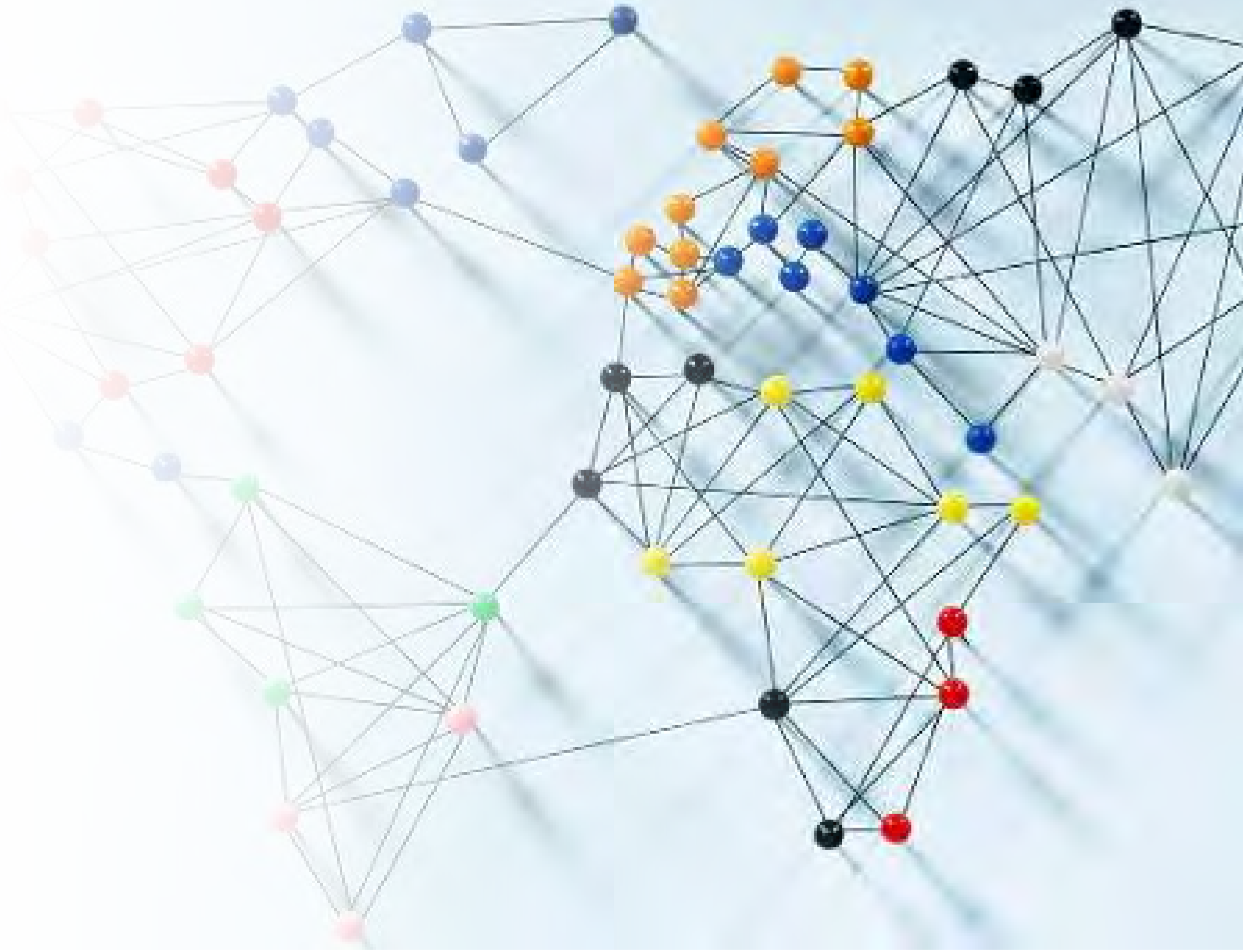
- Every step along this path, there were comments that it would be easier to just build a new plant
- The desire to maintain and improve student work experience has always been at the top of the conversation
- Current location, can't add whey drying – not enough room
- Even with current production goals will need new storage space somewhere within 2 years
- Industry facilities include membrane systems, whey drying, water reuse, and water treatment missing in the current student experience.


THE FUTURE OF AGRICULTURE TOUR!
SHUTTLE AVAILABLE
MEET AT FERDINANDS
GET YOUR COUPON FOR ICE CREAM!
FOLLOW 'THE YELLOW BRICK ROAD'....PAVED, COVERED PATH BETWEEN EDUCATION STATIONS
VIEWING DECKS TO WATCH THE LATEST TECHNOLOGY LIKE OUR ROBOTIC MILKERS
OPEN TO STUDENTS OF ALL AGES!
WE WELCOME GROUPS
ENERGY FOR DAIRY / CREAMERY / AQUACULTURE
FLEXIBLE PENS
CALVES
PARKING
ROAD

Partnerships

Within CAHNRS
Across WSU

Industry
Government
Education
Foundations
Etc…



Outputs

1. Demonstration of modern dairy tools
2. Virtual reality for animal handling practice
3. Access to modern aquaculture
4. Educated & upskilled workforce
5. Resource conservation
6. Energy generation for WSU
7. Precision Ag systems (genetics, nutr. etc)
8. Data handling & needed apps
9. Increased dairy products from students
10. Aquaculture products
11. Research grants & publications
12. Extension grants & publications
13. Teaching grants & publications
14. Programs to up-skill

Outcomes

1. Mended reputation with stakeholders
2. Sustainable dairy system
3. Sustainable aquaculture system
4. Precision ag links across WSU
5. Linkages with agribusiness industries
6. Career opportunities for undergraduates
7. Resilient and adaptable dairy system
8. Contribute to WSU Sustainability goals
9. Enhanced community support & education
10. Qualified workforce
11. FULFILLING the LAND GRANT MISSION

The future of food production:
The WSU Dairy Inspiration Center

Thank you….

The Design Team so far:
Amber Adams Progar, Shulin Chen, Manuel Garcia-Perez,
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The Review Team: the Animal Sciences faculty.