CONNECTING CEDAR RAPIDS COMPANIES WITH IOWA STATE UNIVERSITY RESEARCH AND RESOURCES
Program Summary

- Cedar Rapids Economic Development group working to establish growth and leverage food and biobased industry
- Iowa State’s involvement included reps from Iowa State College of Ag & Life Sciences and Office of Economic Development/Industry Relations
- Started position and program in mid-August 2015
  - Through CALS Center for Crops Utilization Research
    - Office in Cedar Rapids City Hall
- Since connecting with companies, establishing contacts (Aug-Oct)
- Start identifying potential research projects (Oct-Dec)
Background and Experience

- Worked as Quality Assurance Coordinator intern for Country Fresh Inc. in West Des Moines, Iowa – helped facilitate startup of 40,000 sq. ft produce production site.

- 6 years experience in corn wet milling with Grain Processing Corporation
  - 1 year as Technical Service Food Scientist - customer solutions
  - 5 years as Research Food Scientist - natural/modified food starches, maltodextrins, syrup solids, syrups and sweeteners (natural and organic) from a variety of botanical sources

- Very familiar and comfortable with entire research process
  - Ideation, Project Development, Lab experimentation, small/large scale piloting and large scale production

- Vast knowledge of process equipment in most milling and refining scenarios along with processing chemicals, aids, additives, catalysts.
Experience in Ag-Biosciences Industry

- 8 months experience with DuPont Industrial Biosciences
  - Technical Service Representative for Wet Milling Industry
    - Primarily worked with Ingredion, GPC, Penford
  - Provided technical support, onsite and remotely, for the refining industry
    - As it pertained to alpha amylase, glucoamylase and glucose-isomerase
    - Process monitoring and data tracking
    - Process recommendations to Ops Managers and Process Engineers
- Worked with DuPont scientists and engineers to help solve problems encountered in Wet Mill process
- Conducted and led customer enzyme trials - tracking efficiencies and process conditions
Program Vision - ‘Adding Value’

- Iowa State University and the City of Cedar Rapids have created a unique public-private partnership to foster increased interactions between faculty research and the city’s agricultural, food and bioprocessing industries. This partnership will support companies in Cedar Rapids by providing a connection to the resources and research available at Iowa State. It will identify opportunities for collaboration with Iowa State scientists, engineers, extension and economic development.
Why target Cedar Rapids?

- Literally the grain capital of the world!
  - #1 in corn and 20% of world’s oat crop
- Cedar Rapids’ economic growth may lie, more than ever, in the food and bio-processing sector by continually adding value to existing industry
- Support new growth (new companies/technology targeting CR
- Iowa State can help with its vast expertise and established industry support
Cedar Rapids Agribusiness Advantage

Iowa is #1 in 17 agricultural categories and in the top 10 of over 45 categories

- Iowa, and more specifically Cedar Rapids, is perfectly situated in heart of the country’s breadbasket

- Cedar Rapids has an established Bio-Processing and Food-Processing base to take advantage of the areas success in agriculture
Cedar Rapids’ Geographic Advantage

- 70% of corn is produced in Iowa and the surrounding states
- 60% of soybeans are produced in Iowa and the surrounding states

Source: Data Planet
Cedar Rapids Has an Established Bio and Food Processing Base
Complete List...

- City of CR - Water Treatment and WPC
- ADM (Wet and Dry Mills)
- Evergreen Packaging
- Diamond V Mills
- Quaker Oats (Pepsico)
- JRS Pharma - Rettenmeier
- HJ Heinz (Kraft)
- Penford (Ingredion)
- Raining Rose
- Cargill (corn and soy milling)
- General Mills
- Canadian Harvest (used to be SunOpta)
- DuPont Industrial Biosciences
- International Paper
- LeSaffre-BioSpringer
- Red Star Yeast
- Ralston Foods - ConAgra (being bought out again)
- EcoLips
- Specialty Blending
- American Profol
- Kapstone Container Corp.
**Benefits for Corn Processors**

**Transportation**
- Cedar Rapids has access to three major railways that are responsible for transporting about 1.3 million bushels of corn to Cedar Rapids everyday
  - Union Pacific
  - Canadian National
  - Iowa Northern

**Existing Processing Base**
- Three of the largest corn processors are already located in Cedar Rapids
- Over 10% of all corn processing plants in the United States are located in Cedar Rapids

**A Great Place to Live and do Business**
- #1 in terms of projected economic growth and #11 Best Place For Business and Careers *(Forbes)*
- #5 Most Recession Proof City *(Daily Beast)*
- #11 America’s Best Cities on the Rise *(Smarter Travel)*

*As of 2010, 4,000 direct jobs with average salary of $85K plus 8,000 indirect jobs*
1.3 million bushels of corn are processed in Cedar Rapids everyday.

Outside of ethanol production over 200 million bushels of corn are processed in Cedar Rapids in food, feed, and chemical production.

At full capacity the ADM plant in Cedar Rapids will produce twice as much ethanol as any other American city.

Current and future ethanol production is supported by the Renewable Fuel Standard.

### City Ethanol Production

<table>
<thead>
<tr>
<th>City</th>
<th>State</th>
<th>Production (Millions of Gallons per Year)</th>
<th>Bushels of Corn (Millions per Year)</th>
<th>Capacity Expansion (Millions Gallons of Ethanol Per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar Rapids</td>
<td>Iowa</td>
<td>465</td>
<td>172</td>
<td>275</td>
</tr>
<tr>
<td>Columbus</td>
<td>Nebraska</td>
<td>300</td>
<td>111</td>
<td>0</td>
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<tr>
<td>Decatur</td>
<td>Illinois</td>
<td>290</td>
<td>107</td>
<td>0</td>
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<tr>
<td>Pekin</td>
<td>Illinois</td>
<td>247</td>
<td>91</td>
<td>0</td>
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<tr>
<td>Clinton</td>
<td>Iowa</td>
<td>237</td>
<td>88</td>
<td>0</td>
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<tr>
<td>Hereford</td>
<td>Texas</td>
<td>205</td>
<td>76</td>
<td>0</td>
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<td>Blair</td>
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<td>Casselton</td>
<td>North Dakota</td>
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<td>0</td>
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<tr>
<td>Jefferson Jun.</td>
<td>Wisconsin</td>
<td>130</td>
<td>48</td>
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<tr>
<td>Bluffton</td>
<td>Indiana</td>
<td>120</td>
<td>44</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Data Planet
Corn Processing is a Stable Industry in the US

- Corns other uses are (high fructose corn syrup, sugars, starch, alcohol, and cereals) are in constant but steady demand domestically

### US Consumption of Corn: Food and Alcohol

*Source: USDA*
This will lead to increased revenues for cereal and snack food producers over the next several years.
Increasing populations and higher per capita incomes will cause foreign demand for corn products to increase at faster rates.

**Foreign Consumption of Corn**

- Bushels (Millions)
- Source: USDA
The Cedar Rapids Advantage

- Cedar Rapids has the infrastructure to handle bio/food processing
  - Cedar Rapids already processes roughly 3% of all the corn produced in the United States through the production of chemicals, food, and ethanol
- Cedar Rapids is ideally situated for bio/food processing
  - A majority of the country’s soybean, corn and livestock is raised in a 300 mile radius around Cedar Rapids
- Unlike the other prominent industries in Cedar Rapids bio/food processing has stable demand drivers
  - Domestic demand is driven by population growth (decades long time scale) and legislation mandating ethanol usage (multiple years time scale)
  - Foreign demand for corn will only increase as demand for animal feed increases
How are we developing partnerships?

- Active and regular communication between city, companies, university reps and liaison.
- Objectives of program must be clearly established and recognized by both Iowa State and leading manufacturers.
- Companies are being made aware of Iowa State’s research capabilities and partnership opportunities.
- Research and project endeavors must be relevant towards each company’s goals/objectives and timely.
- Companies need to see benefits of the program (i.e. cost savings, product/process improvement, new products, impact on sustainability/environment).
What additional technologies lie behind these large volumes of valuable feedstocks, products, bi-products and ‘waste’ streams?
Six primary resources available to Cedar Rapids

- Center for Crops Utilization Research
- BioCentury Research Farm
- Bioeconomy Institute
- Biomass Energy Conversion Facility
- Office of Economic Development and Industry Relations
- ISU Research Park Corporation
Iowa State’s areas of research excellence involving food and bioprocessing

- Algal cultivation systems
- Biobased polymers, plastics, composites, adhesives and coatings
- Biochemical conversion of biomass and dry-grind ethanol production
- Biomass cropping systems
- Fats and oils chemistry and processing
- Fermentation technologies and products
- Grain quality testing
- Nutraceuticals and functional foods
- Plant fractionation
- Starch chemistry and utilization
- Soy protein chemistry and utilization
- Thermochemical conversion of biomass using fast pyrolysis, gasification and solvent liquefaction
Progress to Date

- Met with nearly all of Cedar Rapids companies at least once
- Ongoing Red Star Yeast Project using algal system
- Quaker Oats wants to explore reuse for oat hulls and potential extrusion work
- International Paper - BOD reduction
- American Profol - Iowa State Mechanical Engineering faculty member writing proposal for structural analysis of embossing equipment for poly film processing - significant cost savings potential
- City of Cedar Rapids water & waste water treatment - lime sludge reuse, fly ash reuse, opportunities for new technologies with Nutrient Reduction Strategy
- General Mills - sugar delivery system, new energies?
- ADM - Wood waste, water usage, coal combustion, thalium
New Industry?

- Big Ox Energy - organic recycling for biogas, biosolids and bioliquids
- Annikki (Austrian based) - enzymatic conversion of feedstock for chemicals
- Earth Energy Renewables (Texas based) - anaerobic digestion of feedstock for chemicals
- NetZro (Minneapolis) - small scale startup using infrared drying technology of waste to reclaim water and nutrients
- SwineGuard (Iowa Startup Accelerator) - saving piglets by preventing sow lay on
Questions/Comments?

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