Workforce Innovation and Opportunity Conference
October 8-9, 2018

Sheri Gonzales Warren
Mid-America Regional Council
Traded Sectors

- Advanced Manufacturing
- Information Technology
- Engineering & Architecture
- Life Sciences
- Finance & Insurance
NUMBER OF QUALITY JOBS

GROSS REGIONAL PRODUCT

MEDIAN HOUSEHOLD INCOME

TRADE
Globally Competitive Sectors

IDEAS
Innovation & Entrepreneurship

PEOPLE
Human Capital
Relevant, Authentic Learning at Scale

Teacher Inspired by Experiential Learning

5 Classes per Day, each with 30 Students

150 Students per Semester

300 Students per Year

9,000 Students over a 20-Year Career
Clear Entry Point & Career Pathway For Non-Degreed Workers

INFORMATION TECHNOLOGY

Career Pathways and Job Demand in Greater Kansas City
http://kcworkforce.org/careerpath.htm

A Labor Analysis of the Life Sciences Industry in the Kansas City Region

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Current Jobs</th>
<th>Average Wage</th>
<th>Entry-Level Credential</th>
<th>Growth Demand</th>
<th>Replacement Demand</th>
<th>Total Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 10 in Research and Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Developers, Applications</td>
<td>3,391</td>
<td>$94,100</td>
<td>Bachelor</td>
<td>+1,501</td>
<td>+600</td>
<td>+2,101</td>
</tr>
<tr>
<td>Computer Systems Analysts</td>
<td>2,161</td>
<td>$84,100</td>
<td>Bachelor</td>
<td>+937</td>
<td>+329</td>
<td>+1,267</td>
</tr>
<tr>
<td>Software Developers, Systems Software</td>
<td>1,836</td>
<td>$95,600</td>
<td>Bachelor</td>
<td>+700</td>
<td>+274</td>
<td>+974</td>
</tr>
<tr>
<td>Computer Programmers</td>
<td>1,731</td>
<td>$75,600</td>
<td>Bachelor</td>
<td>+378</td>
<td>+374</td>
<td>+752</td>
</tr>
<tr>
<td>Computer User Support Specialists</td>
<td>1,655</td>
<td>$50,200</td>
<td>Some college</td>
<td>+556</td>
<td>+245</td>
<td>+801</td>
</tr>
<tr>
<td>Network &amp; Computer Systems Admins.</td>
<td>910</td>
<td>$76,000</td>
<td>Bachelor</td>
<td>+260</td>
<td>+134</td>
<td>+394</td>
</tr>
<tr>
<td>Computer Network Architects</td>
<td>525</td>
<td>$95,400</td>
<td>Bachelor</td>
<td>+112</td>
<td>+72</td>
<td>+184</td>
</tr>
<tr>
<td>Computer Network Support Specialists</td>
<td>498</td>
<td>$61,700</td>
<td>Associate</td>
<td>+70</td>
<td>+72</td>
<td>+142</td>
</tr>
<tr>
<td>Web Developers</td>
<td>407</td>
<td>$58,900</td>
<td>Associate</td>
<td>+142</td>
<td>+78</td>
<td>+220</td>
</tr>
<tr>
<td>Computer Occupations, All Other</td>
<td>392</td>
<td>$84,200</td>
<td>Bachelor</td>
<td>+71</td>
<td>+65</td>
<td>+136</td>
</tr>
</tbody>
</table>

Top 10 in Bioinformatics

Top 10 in Manufacturing
Balance Between Technical Skills & Core Competencies

**Common Sector Competencies**

- **Fundamental:** core competency
- **Advanced:** leader competency

A blueprint for workplace competencies addressing multiple industry sectors, customized to the needs of the Greater Kansas City region.

- **Price of admission**
- **Competitive edge**

Easier to fulfill

More difficult to fulfill
Align Curriculum to New and Emerging Areas

CAREER & TECH EDUCATION PROGRAM ALIGNMENT

<table>
<thead>
<tr>
<th>KC RISING INDUSTRY SECTORS*</th>
<th>NATIONAL CAREER CLUSTERS FRAMEWORK</th>
<th>KANSAS CTE PROGRAMS</th>
<th>MISSOURI CTE PROGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIFE SCIENCES</td>
<td>Agriculture, Food &amp; Natural Resources</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Architecture &amp; Construction</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Arts, A/V Technology &amp; Communications</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>FINANCE &amp; INSURANCE</td>
<td>Business Management &amp; Administration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Education &amp; Training</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Finance</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>INFORMATION TECHNOLOGY</td>
<td>Government &amp; Public Administration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Health Science</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Hospitality &amp; Tourism</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Human Services</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ADVANCED MANUFACTURING</td>
<td>Information Technology</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Law, Public Safety, Corrections &amp; Security</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ARCHITECTURE &amp; ENGINEERING</td>
<td>Manufacturing</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SUPPLY CHAIN LOGISTICS</td>
<td>Marketing</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Science, Technology, Engineering &amp; Math</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Transportation, Distribution &amp; Logistics</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Expanded STEM Capacity
Increase Diverse Talent Base

Design Professionals by Race/Ethnicity* | KC vs. US, 2016

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Asian</th>
<th>Other</th>
<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KC</strong></td>
<td>82%</td>
<td>6%</td>
<td>7%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>US</strong></td>
<td>74%</td>
<td>5%</td>
<td>12%</td>
<td>8%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*White, Black, Asian and Other categories exclude those of Hispanic ethnicity as they are counted in the Hispanic category.

Source: IPUMS-USA, University of Minnesota, www.ipums.org, based on 2016 ACS, 5-year data.

Design Professionals by Gender | KC Metro, 2000 vs. 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>2016</td>
<td>85%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Talent-to-Industry Exchange

• Industry led
• Regional and comprehensive in approach
• Data driven and action oriented

Three Phases:
1. A detailed economic and labor analysis
2. A workforce action plan
3. Plan implementation
Competitive Advantage

Kansas City’s life science industry employment share is 27 percent larger than the U.S. average.

Kansas City ranks ninth highest among 30 peer metros in Life Sciences overall, and fifth in the bioinformatics component.
Employment Growth

There is strong employment growth in this sector, with an increase of 15,000 jobs from 2001-2016 – adding about 1,000 jobs per year to the area’s economy.
Employment Growth

Some of the fastest growth in life science manufacturing occupations over the next few years will occur in entry-level positions that require only high school or some college.

<table>
<thead>
<tr>
<th>Top 10 in Manufacturing</th>
<th>225</th>
<th>$42,800</th>
<th>High school</th>
<th>+23</th>
<th>+61</th>
<th>+84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspectors, Testers, Sorters, Weighers</td>
<td>187</td>
<td>$32,900</td>
<td>High school</td>
<td>+25</td>
<td>+67</td>
<td>+93</td>
</tr>
<tr>
<td>Packaging and Filling Machine Operators</td>
<td>175</td>
<td>$38,000</td>
<td>High school</td>
<td>+11</td>
<td>+45</td>
<td>+56</td>
</tr>
<tr>
<td>Mixing and Blending Machine Operators</td>
<td>150</td>
<td>$43,300</td>
<td>High school</td>
<td>+45</td>
<td>+35</td>
<td>+80</td>
</tr>
<tr>
<td>Team Assemblers</td>
<td>148</td>
<td>$57,300</td>
<td>High school</td>
<td>+5</td>
<td>+27</td>
<td>+32</td>
</tr>
<tr>
<td>First-Line Supervisors</td>
<td>146</td>
<td>$37,000</td>
<td>High school</td>
<td>+15</td>
<td>+39</td>
<td>+54</td>
</tr>
<tr>
<td>Maintenance and Repair Workers</td>
<td>126</td>
<td>$37,600</td>
<td>Some college</td>
<td>+23</td>
<td>+30</td>
<td>+54</td>
</tr>
<tr>
<td>Computer and Office Machine Repairers</td>
<td>119</td>
<td>$28,700</td>
<td>&lt; High school</td>
<td>+17</td>
<td>+38</td>
<td>+55</td>
</tr>
<tr>
<td>Laborers and Goods Movers</td>
<td>98</td>
<td>$67,600</td>
<td>High school</td>
<td>+5</td>
<td>+48</td>
<td>+53</td>
</tr>
<tr>
<td>Chemical Plant and System Operators</td>
<td>83</td>
<td>$40,000</td>
<td>High school</td>
<td>+16</td>
<td>+22</td>
<td>+37</td>
</tr>
</tbody>
</table>

Source: Jobs EQ, MARC
Career Ladders

**MANUFACTURING**
- **DIRECTOR OF MANUFACTURING**
  - Master’s or doctoral degree + work experience
  - Master’s degree in chemistry, biochemistry, biology
- **MANUFACTURING MANAGER**
  - Bachelor’s degree + 5-8 years work experience
- **MANUFACTURING SUPERVISOR**
  - Bachelor’s degree + 2-5 years work experience
- **MANUFACTURING ASSOCIATE**
  - Bachelor’s degree
  - Bachelor’s degree in chemistry, biochemistry, biology, microbiology
- **MANUFACTURING TECHNICIAN**
  - Associate degree
- **MANUFACTURING ASSISTANT**
  - Associate degree
- **INSTRUMENT/CALIBRATION TECHNICIAN**
  - Six months on-the-job training
  - Associate degree in biology, chemistry, biotechnology

**DIAGNOSTIC/TESTING**
- **LABORATORY MANAGER**
  - Master’s degree
  - Master’s degree in chemistry, biochemistry, biology, microbiology
  - 8–10 years of work experience
- **LABORATORY SUPERVISOR**
  - Master’s degree
  - Master’s degree in chemistry, biochemistry, biology, microbiology
  - 5–10 years of work experience
- **FORENSIC SCIENCE TECHNICIAN**
  - Bachelor’s degree
- **MEDICAL TECHNOLOGIST/CLINICAL LAB SCIENTIST**
  - Bachelor’s degree
- **HISTOTECHNOLOGIST**
  - Bachelor’s degree
- **CYTOLOGY TECHNICIAN**
  - Bachelor’s degree
- **MICROBIOLOGIST**
  - Bachelor’s degree
- **TOXICOLOGIST**
  - Bachelor’s degree
- **PATHOLOGIST**
  - Bachelor’s degree
- **PHLEBOTOMIST**
  - Associate degree or six months on-the-job training
  - Associate degree in biology, chemistry or biotechnology
- **MEDICAL LABORATORY ASSISTANT**
  - Associate degree

**RESEARCH & DEVELOPMENT**
- **VICE PRESIDENT OF RESEARCH & DEVELOPMENT**
  - Doctoral degree + work experience
- **SCIENTIFIC DIRECTOR**
  - Doctoral degree + work experience
- **PRINCIPAL SCIENTIST/PRINCIPAL INVESTIGATOR**
  - Doctoral degree + work experience
- **SENIOR SCIENTIST**
  - Master’s or doctoral degree + work experience
- **SCIENTIST II**
  - Master’s degree + work experience
- **SCIENTIST**
  - Master’s degree
- **SENIOR RESEARCH ASSOCIATE**
  - Bachelor’s degree + work experience
- **RESEARCH ASSOCIATE**
  - Bachelor’s degree
- **RESEARCH ASSISTANT**
  - Bachelor’s degree
- **TECHNICIAN**
  - Six months on-the-job training
  - Six months on-the-job training
- **ANIMAL CARE TECHNICIAN**
  - On-the-job training
  - Associate degree in biology, chemistry, biotechnology
- **KENNEL ATTENDANT**
  - On-the-job training
  - Associate degree in biology, chemistry, biotechnology
Survey Says...

In the last year, how often have you needed to recruit workers for entry-level positions from outside the region?

- Occasionally: 15.4%
- Frequently: 0.0%
- Rarely: 19.2%
- Not at all: 65.4%

Potential Industry Disruptors
Percent of business leaders that expect significant impacts on their business from each disruptor

- Big Data/Analytics: 63%
- Artificial Intelligence: 53%
- Workforce Diversity: 32%
- Internet of Things: 32%
- Other Scientific Advancement: 21%
- Robotics: 16%
- Aging Population: 16%
- 3D Printing: 11%
- Autonomous Vehicles: 11%
Industry Trends

**Structural shifts in research and development** — Companies in the life sciences industry are moving from internal to external research and development, often outsourcing this function to contract research organizations (CROs), developing partnerships with universities, or acquiring startup companies. With one of the largest concentrations of CROs in the country, the Kansas City region is uniquely positioned to meet business needs.

**A fertile environment for bioinformatics** — This is a fast-growing segment of the life sciences industry, but it is not yet well-defined. Big data is available, but firms need talented workers who can analyze and apply that data. Better definitions of the job spectrum and necessary skills will help educational institutions craft degree programs that meet employer needs. The Kansas City region has the capacity to become a national leader in this field.

**The nexus of animal and human health** — Discoveries in animal health often apply to human health, but regulatory approval processes for animal health products typically take half the time at one-tenth the cost. With its nationally and internationally recognized Animal Health Corridor, the region has an opportunity to expand interdisciplinary collaborations that identify intersections between animal and human health.
INDUSTRY CHALLENGES

MORE TALENT | JOB-READY TALENT | FASTER, PLEASE

**Scaling up talent development** — Experiential learning exposes young people to careers in life sciences, but not at a large enough scale to meet industry needs. More teacher externships are needed to take talent development to scale.

**Providing structure to maximize participation** — Businesses that are willing to participate in experiential learning often find it hard to balance requests from multiple sources and have no organized system to connect with educational institutions efficiently.

**Adapting to fast-changing needs** — The Life Sciences industry moves quickly and can be unpredictable, making it difficult for firms to articulate the skill sets they will need a few years from now, while universities often need extensive lead time to launch new four-year degree programs.
Industry Priorities

**BIG IDEA #1**
CURRICULUM DEVELOPMENT: Define the job spectrum, skill sets and education needs for new and emerging areas like bioinformatics.

**BIG IDEA #2**
Create industry-specific, stackable career credentials for strong career pathways, continuous learning opportunities and flexible, rapid response to employer needs.

Creating a Stronger Foundation
• Increased Industry Exposure
• Focus on Core Competencies
• Expand Public/Private Partnerships
Talent-to-Industry Exchange
A&E firms are by far the largest employers of design professionals, but overall, more design professionals work in Product Engineering than Design Services.
KC Global Design Occupations

KC Global Design Professionals by Broad Occupation Category

Source: JobsEQ

KC Global Design Professionals by Occupation

Source: JobsEQ

*Note: To more effectively analyze the labor market for architects and engineers, the occupation category of surveyors, cartographers and photogrammetrists has been included under Technicians rather than Architects. Though the latter is suggested by the Standard Occupation Classification System, this would inflate the number of professionals counted as Architects by about one-third.
## Design Occupation Demand

### KC Global Design Occupation Totals by Type of Engineering

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Jobs/Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineers</td>
<td>2,035 / 643</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>798 / 1,326</td>
</tr>
<tr>
<td>Electrical Engineers</td>
<td>693 / 1,188</td>
</tr>
<tr>
<td>Architects</td>
<td>1,300 / 144</td>
</tr>
<tr>
<td>Industrial Engineers</td>
<td>147 / 1,229</td>
</tr>
<tr>
<td>Electrical/Electronic Techs</td>
<td>277 / 839</td>
</tr>
<tr>
<td>Electronics Engineers</td>
<td>199 / 875</td>
</tr>
<tr>
<td>Architectural/Civil Drafters</td>
<td>737 / 139</td>
</tr>
<tr>
<td>Civil Engineering Techs</td>
<td>587 / 156</td>
</tr>
<tr>
<td>Other Engineers</td>
<td>158 / 575</td>
</tr>
<tr>
<td>Mechanical Drafters</td>
<td>222 / 278</td>
</tr>
<tr>
<td>Engineering Techs</td>
<td>89 / 370</td>
</tr>
<tr>
<td>Surveying/Mapping Techs</td>
<td>351 / 101</td>
</tr>
<tr>
<td>Environmental Engineers</td>
<td>200 / 241</td>
</tr>
<tr>
<td>Computer Hardware Engineers</td>
<td>23 / 345</td>
</tr>
<tr>
<td>Surveyors</td>
<td>309 / 52</td>
</tr>
<tr>
<td>Mechanical Engineering Techs</td>
<td>139 / 219</td>
</tr>
<tr>
<td>Industrial Engineering Techs</td>
<td>14 / 307</td>
</tr>
<tr>
<td>Electrical/Electronics Drafters</td>
<td>140 / 130</td>
</tr>
</tbody>
</table>

Of the five largest design professions, civil engineers and architects are mostly employed in **Design Services**, while mechanical, electrical and industrial engineers are mostly employed in **Product Engineering**.

**Source:** JobsEQ
Growing the Talent Pipeline

**WHY IS SUPPLY LOW?**

**STUDENTS**
- Aren’t exposed to the industry
- Perceive the work as too hard, too much math
- Choose tech-based programs instead

**TALENTED WORKERS**
- Often leave the area after graduation
- Can be difficult to attract and retain in the KC region
- Have lots of options and can be choosy

**WHY IS DEMAND HIGH?**

**COMPANIES**
- Are growing in a strong economy
- Are losing boomers to retirement
- Lack mid-level talent due to ‘lost generation’

**COMPETITION**
- Firms compete with other industries such as consulting, technology, finance
- Engineering degrees have universal value

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total demand (10 year forecast)</th>
<th>Estimated supply (250-mile radius)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineers</td>
<td>2,272</td>
<td>4,490 (bachelor’s and above)</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>1,643</td>
<td>7,500 (bachelor’s and above)</td>
</tr>
<tr>
<td>Electrical Engineers</td>
<td>1,444</td>
<td>7,530 (bachelor’s and above)</td>
</tr>
<tr>
<td>Industrial Engineers</td>
<td>1,126</td>
<td>1,680 (bachelor’s and above)</td>
</tr>
<tr>
<td>Architects</td>
<td>978</td>
<td>1,600 (postgraduate degrees)</td>
</tr>
</tbody>
</table>
Balance Between Technical Skills & Core Competencies

**COMMON SECTOR COMPETENCIES FOR THE Kansas City REGION**

A blueprint for workplace competencies addressing multiple industry sectors, customized to the needs of the Greater Kansas City region.

- Focus on the customer
- Drive results
- Collaborate
- Instill trust
- Plan and align
- Read for information
- Use basic applied mathematics

**PRICE OF ADMISSION**

- Manage complexity
- Value differences
- Think critically
- Listen actively
- Write effectively
- Be flexible and adaptable

**FUNDAMENTAL**
Core Competencies

- Display courage
- Manage ambiguity
- Solve complex problems
- Speak influentially
- Self-develop
- Manage projects
- Attract and develop talent

**ADVANCED**
Leadership Competencies

- Demonstrate business insight
- Cultivate innovation
- Build effective teams
- Interpret and apply data

**ARCHITECTURE & ENGINEERING**
Functional Competencies

- Project management
- Business skills
- Detail oriented
- Business development
- Quality control
- Marketing
- Quality Assurance

- Building information modeling software, such as Revit
- Construction experience
- 3-D design
- Management experience
- Ability to travel
Technological Innovations

Future Industry Disruptors
Ranked by highest impact as a percent of total responses

3-D Printing 19%
Aging Population 14%
New Materials 13%
Workforce Diversity 13%
Big Data/Analytics 13%
Internet of Things 12%
Driverless Vehicles 10%

Source: MARC Industry Leader Survey
From the potential action steps described previously, the global design workforce team has adopted three high-level recommendations for immediate focus:

1. Market the Kansas City area and its employers to regional university students and young professionals.
2. Strengthen efforts to attract and retain a diverse workforce.
3. Encourage young people to consider professions in the KC Global Design industry.