

Preparing Technicians for the **FUTURE OF WORK**

**Regional Convening on the Future of Work
Texas Gulf Coast Region**

**San Jacinto College
October 30, 2020**



Welcome

- **Hope Cotner**
President, Center for Occupational Research and Development (CORD)
- **Dr. Sarah Janes**
Associate Vice Chancellor, Continuing and Professional Development
San Jacinto College
- **Ann-Claire Anderson**
Vice President, Special Projects, CORD
Project Principal Investigator



Preparing Technicians for the
FUTURE OF WORK

A National Science Foundation

Advanced Technological Education (NSF ATE) Project

Ann-Claire Anderson, Principal Investigator



Project Mission



Enable the NSF-ATE community (2-year colleges) to collaborate regionally with industry partners, within and across disciplines, on the transformation of associate degree programs to prepare US technicians for the work of the future.



Project Leadership Team

- **Ann-Claire Anderson, PI**
Vice President, Special Projects
CORD
- **Hope Cotner, Co-PI**
President, CORD
- **Dr. Mike Lesiecki, Co-PI**
Senior Consultant, CORD; Retired
Director, MATEC Networks
- **Dr. Richard Gilbert, Co-PI**
Professor, Chemical and Biomedical
Engineering, University of South Florida
College of Engineering Research
- **Dr. Marilyn Barger, Special Advisor**
Director, Florida Advanced
Technological Education (FLATE)
Center of Excellence
- **Liz Myrick, Project Manager**



Texas Gulf Coast Regional Convening Purpose

- Share our findings on the cross-cutting, interdisciplinary skills and knowledge needed by technicians
- Discuss new technologies and their impact on future technician education
- Identify ways in which the project can collaborate with regional colleges and workforce entities on issues related to preparing the skilled technical workforce for the future





The Future is Now

- Nature of work changing at unprecedented speeds
- Technology advancements in machine learning, AI, IoT, and robotics eliminating some jobs, creating others
- **Technicians sit at the center of much of this disruption**
- Education must keep up
- Students' career paths will evolve

Preparing Technicians for the
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What is the STEM Technician's Role?



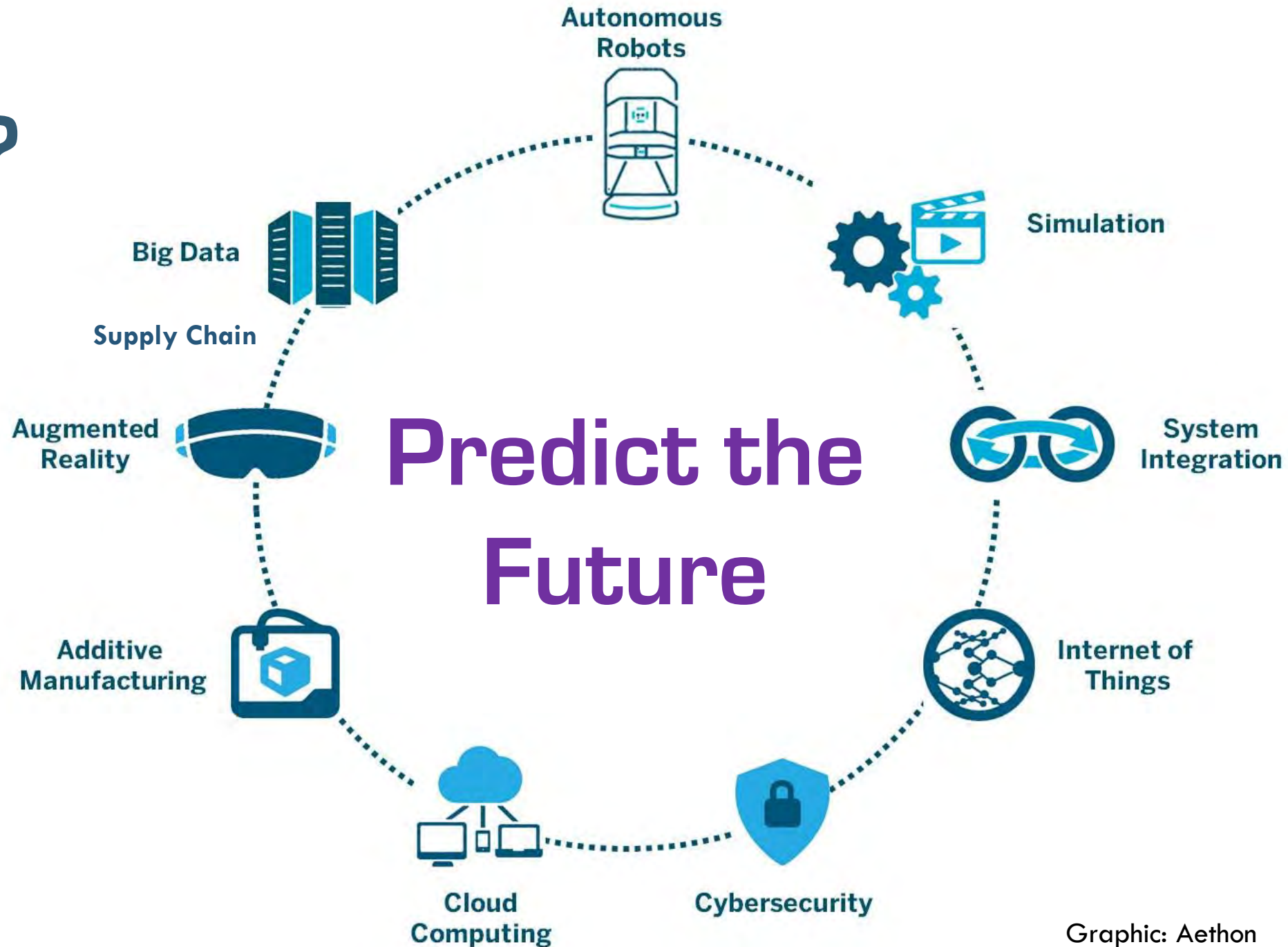
Smart machines are getting smarter and production, assembly, monitoring, and maintenance in a wide variety of industrial settings is becoming more efficient.

What does this mean for the role of the technician?

Are there new foundational skills for future STEM technicians?



Our Job?



Gathering Information from Many Sources

- Industry Advisors
- NSF Advanced Technological Education Leadership Caucus
- Industry/education focus groups
- Regional convenings
- Recent business news and research on Future of Work
- Existing competency models
- Industry site visits and interviews of working technicians and supervisors





NATIONAL SCIENCE BOARD

THE SKILLED TECHNICAL WORKFORCE:

Crafting America's Science & Engineering Enterprise

3.4M Why do the National Academies expect 3.4 million unfilled skilled technical jobs by 2022?

139 What did 139 stakeholders from across the country say the U.S. should do to improve opportunities for skilled technical workers?

4 What 4 recommendations do we offer for building the Skilled Technical Workforce of the future?



Navigating the Changing Nature of Work



The Work of the Future: Shaping Technology and Institutions

FALL 2019 REPORT



Our Observations about the Future

1. More robots and more cobots with more functionality are being installed everywhere. These are more complicated *and* more connected.
2. Most technicians need to know more about digital communication protocols between equipment.
3. More connected and automated robots and machines mean more challenging troubleshooting situations.



Our Observations about the Future

4. Across all operators and technicians, strong fundamentals in math, science, and technology are the key to understanding the new equipment and processes.
5. Employability skills (or human skills) are still extremely important — maybe even more so today than in the past.



New Foundational, Cross-cutting Knowledge and Skills

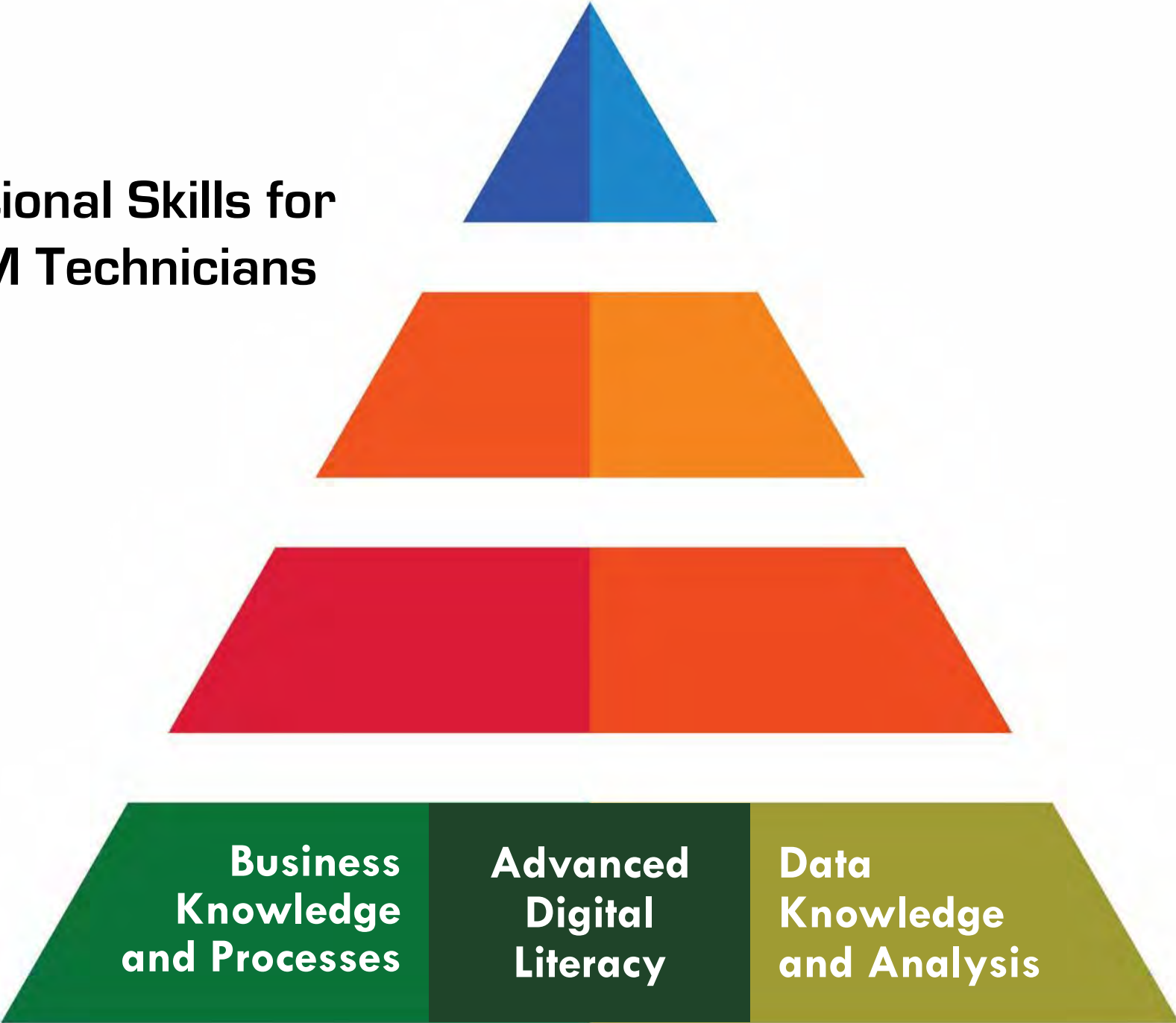


Knowledge & Skill Areas to “Future Proof” STEM Technicians?

- **Skill Area 1: Business Knowledge and Processes**
- **Skill Area 2: Advanced Digital Literacy**
- **Skill Area 3: Data Knowledge and Analysis**



**Foundational Skills for
All STEM Technicians**



**Business
Knowledge
and Processes**

**Advanced
Digital
Literacy**

**Data
Knowledge
and Analysis**

Why are these skills critical?

“A core benefit of foundational skills is the capacity to adapt: having a broader skill base isn’t simply about meeting the needs of today’s jobs. Rather, these skills equip jobseekers and incumbent employees for the future, enabling them to navigate a dynamic landscape of accelerating change: job losses, job changes, and job creation.”

“Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation” (New York: McKinsey Global Institute, 2017)



Setting the Stage: Business Knowledge & Processes



Skill Area 1: Business Knowledge and Processes

Understand an enterprise, its value chain, and business practices. Includes work performance skills as well as ethics surrounding the use of new technologies.



Skill Area 1: Essential Cross-Cutting Skills in Business Knowledge and Processes

1. Blockchain
2. Overall Equipment Efficiency
3. Business cycles
4. Communication *
5. Continuous process improvement *
6. Entrepreneurship
7. Ethics *
8. Customer focus/Stakeholder analysis *
9. Lean processes *
10. Market trends
11. ROI, or return on investment
12. Risk management
13. Supply/demand
14. Logistical chains
15. Vertical and horizontal integration



Our Speakers

- **Peter Beard**, Peter Beard, Senior Vice President for Regional Workforce Development at the Greater Houston Partnership
- **Donald McCoy**, STEM Education Consultant; Retired - IBM Global Workforce Development and K-18 Diversity Pipeline Programs



Preview of Next Week's Topic: Advanced Digital Literacy

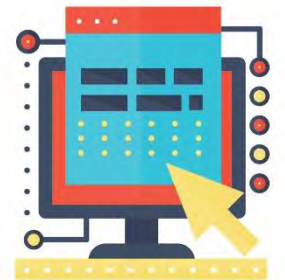
“Middle-skill workers will need to learn new digital skills to use the automated technologies, and **strong digital skills are becoming increasingly necessary for all workers**, regardless of their industry, occupation or education level.”

Navigating the Changing Nature of Work
UpSkill Houston, July 2020



Skill Area 2: Advanced Digital Literacy

Understand digital communications and networking; cloud interface; cybersecurity; machine learning, sensors, programming and human-machine interfaces at a higher than introductory level



Essential Cross-Cutting Skills in Advanced Digital Literacy

1. Artificial Intelligence
 - Machine learning
2. Automation/robots *
3. Basic programming
4. Function block diagram programming
5. Digital literacy/fluency *
 - Cloud literacy
6. Digital twins
7. Edge computing
8. Network architecture
9. Network/device communication *
 - Internet of Things (IoT)
 - Security controls *



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