Research Collaborations at the Community College
Research Collaborations at the Community College

Panel Members

Steve Paquette, President and CEO
Stark Development Board Inc.

Rebecca Priest, Senior Director of Emerging Technologies & Strategic Grants Development
Stark State College

Mark Fleiner, CEO

Dorey Diab, Ph.D., Provost and Chief Academic Officer
Stark State College
Ohio’s New Economic Strategy

• Since 2002, Ohio has been implementing a new technology-based economic development strategy

• The goal is to bridge a key gap in translating innovation between pure basic research and the more applied and development-focused industry research
Ohio’s New Economic Strategy

• Ohio has a rich basic research environment. Among its largest universities, Ohio State, Cincinnati and Case Western Reserve - exceed $800 million in federal research funding (2008)
Ohio’s New Economic Strategy

- Ohio is also home to a number of world-class non-profit research institutes and federal laboratories, such as the Cleveland Clinic, Battelle Memorial Institute, Wright-Patterson Air Force Base (home of the Air Force Research Laboratory) and NASA Glenn Research Center.
Ohio’s New Economic Strategy

• Ohio is also home to industrial research and development

• Of the top 500 U.S. firms conducting R&D, 14 are headquartered in Ohio

• Another 33 companies of the top 500 U.S. R&D companies have substantial operations in Ohio
Top 500 U.S. Firms in R&D Headquartered in Ohio

- Procter & Gamble
- TRW
- Goodyear Tire & Rubber
- Eaton
- Lubrizol
- Owens Corning
- Parker-Hannifin
- Steris
Top 500 U.S. Firms in R&D Headquartered in Ohio

- Diebold
- Reynolds & Reynolds
- The Timken Company
- Nordson
- Owens-Illinois
- Sherwin-Williams
Foundation for Success

An in-depth analysis by Battelle Memorial Institute was released in 2002 that identified five core clusters that provide a foundation for world-class technology-based economic development in Ohio:

- **Advanced materials**
- **Biosciences**
- **Information technology**
- **Power and propulsion**
- **Instruments, controls, electronics and advanced manufacturing technologies**

Each of these clusters has reached critical mass in Ohio, and has established a track record of excellence.
Creation of Ohio Third Frontier Program

- A visionary public-private partnership was created in 2002 with bipartisan leadership and support. The Ohio Third Frontier (OTF) is a 10-year program funded by $1.6 billion bond.

- Makes merit-based state investments in promising new technologies, research, small businesses and entrepreneurs.
Creation of Ohio Third Frontier Program

- Builds and attracts new companies, supports business expansion and creates new jobs

- The goal of OTF was to establish Ohio as an innovation leader, to fuel new economic growth and job creation through high-tech commercially relevant applications
Creation of Ohio Third Frontier Program

The Ohio Third Frontier Program focuses on clusters that give Ohio competitive advantages

- Advanced and Alternative Energy
- Biomedical
- Advanced Materials
- Instruments-Controls-Electronics
- Power and Propulsion
Ohio Third Frontier Results (2002-2009)

• Most successful economic development and jobs creation program in the state
• $6.6 billion in economic activity
• Consistent $8 to $9 invested for every state dollar spent
• 21.8% total return on investment *(SRI December, 2008 Report)*
• Through June 2009, Third Frontier has created 48,000 new jobs, helped accelerate growth of 571 companies
## What is OTF: Five Key Technology Structures

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Description</th>
<th>Example OTF Recipient Companies</th>
<th>Investment</th>
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<tbody>
<tr>
<td><strong>Advanced Energy</strong></td>
<td>The advanced energy industry in Ohio includes such areas as fuel cells, photovoltaics, wind, biomass and energy storage.</td>
<td>Parker Hannifin, Rolls-Royce, Velocys, Global Cooling, NexTech, Xunlight, Catacel, GrafTech, SCI, American Trim, UltraCell</td>
<td>$70 M</td>
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<tr>
<td><strong>Advanced Materials</strong></td>
<td>The advanced materials industry in Ohio includes such areas as advanced polymers, composites, nano-materials, liquid crystals, and bio-based materials.</td>
<td>Swagelock, The Andersons, Applied Sciences, Nanotek, Zyvex, WebCore, AlphaMicron, Kent Displays</td>
<td>$96 M</td>
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<tr>
<td><strong>Biomedical</strong></td>
<td>The biomedical industry in Ohio includes such areas as cardiovascular, biomedical imaging, regenerative medicine, and orthopedics.</td>
<td>Arteriocyte, NDI Medical, ViewRay, Hyper Tech, ChanTest, Diagnostic Hybrids, Gene Express</td>
<td>$208 M</td>
</tr>
<tr>
<td><strong>Instruments, Controls, and Electronics</strong></td>
<td>The ICE industry in Ohio includes such areas as sensors for all manner of manufacturing, unmanned aerial vehicles, infrared imaging detection, and RFID technologies.</td>
<td>Faraday, L-3 Communications, Srico, YSI, Western Robotics, LSP Technologies, Western Datacom</td>
<td>$27 M</td>
</tr>
<tr>
<td><strong>Power and Propulsion</strong></td>
<td>The power and propulsion industry in Ohio includes such areas as aircraft turbines, industrial turbines, and power generation.</td>
<td>GE Aircraft, Rolls-Royce, Teledyne</td>
<td>$22 M</td>
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</tbody>
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About Stark Development Board

• Created in 1985 by Stark County business and community leaders

• A private nonprofit corporation

• Mission – to keep businesses in Stark County, to help local companies expand and to attract new companies and capital investment
About Stark Development Board

• Governed by 45-member Board of Directors and a 13-member Executive Committee

• Staff of 6 full-time professionals

• Core Programs: Business Retention, Financing, New Business Attraction, Real Estate and Site Selection, Infrastructure, and Brownfield Redevelopment
Stark Development Board: Record of Success (1985-2009)

- 38,000 Stark County Jobs Created or Retained
- $900 million of new payroll
- $2 billion in new capital investment county-wide
- Have helped to provide over $700 million in loan financing to 625 companies
Research Collaborations at the Community College

Panel Member

Rebecca Priest
Senior Director of Emerging Technologies & Strategic Grants Development
Stark State College
A Case Example of a Private-Public Partnership
to Develop Advanced Fuel Cell Technology
Background on Stark State College

- Started as Canton Area Technical School in 1960
- Early collaborations with Timken Co. and Diebold
- Diebold partner in Advanced Technology Center/Diebold Training Center
- Timken partner in W.R. Timken Center for Information Technology
- For 50 years, Stark State key to economic development of region
- College growth reflects need for lifelong learning, advanced skills
Collaboration: A Strong Component of Grants

• Encouraged by many funding sources, sometimes required
• A smart thing to do – but not always easy to execute
• Strengthens your proposal and project
• Gives funding source bigger bang for its buck
• Broadens scope and maximizes impact of project
• Can lead to relationship growth with partner organizations
SSCT-RRFCS Collaboration Overview

• It started in 2002 with the following organizations talking with each other: SOFCo-EFS, Stark Development Board, Stark State College and Case Western Reserve University

• In 2003, we sought and received $3.35M of Ohio Third Frontier funds to build a Fuel Cell Prototyping Center on Stark State’s campus

• Since 2002, that $3.35M has grown to $21M+ in fuel cell-related grant projects on our campus, leveraging another $9M in college/partner matching funds
Non-Research Fuel Cell Grants Received

Sources:

**State**
- Ohio Board of Regents
- State Legislature

**Federal**
- Department of Education
- Department of Labor
- National Science Foundation

**Total: $4 M**
Research Fuel Cell Grants Received

With Lockheed Martin & Technology Management Inc.:
Sources: Ohio Third Frontier, DOE, DOD
Total: $2.8 M

Facilities/Research Fuel Cell Grants Received

With SOFCo/Rolls-Royce Fuel Cell Systems:
Sources: Ohio Third Frontier, SBA, DOE
Total: $13.8 M
Lessons Learned from Research Collaborations

• Partnerships take time and patience due to the differences in organizations
• Partnerships take advantage of the unique strengths of each organization
• Partnerships need to be flexible
• Partnerships benefit the partners to different degrees at various points in time
• Sustaining partnerships over time requires mutual respect and nurturing
Research Collaborations at the Community College

Panel Member

Mark Fleiner

CEO
Rolls-Royce Group plc

Four different businesses utilizing common aero technology
Rolls-Royce Fuel Cell Systems is creating...

- The first cost competitive distributed energy solution
- Potential net-AC electrical efficiencies in the >60%
- Very low environmental impact, quick wins on air quality
Fuel Cell Prototyping Center: Stark State College Campus
Fuel Cell Prototyping Center: Research, Development, Testing, and Production
Evolution of the Relationship

2006 thru 2010 thru 2012....Future

Research
Development & Testing
Pilot Scale Production
Installation
Commission
Service
Maintenance

As the business evolves...
alignment with educational curriculum evolves
Aligning Curriculum to Support Industry

Today…

• Laboratory (Research, Data Acquisition & Analysis)
• Test Facility (Build, Commission & Operation)
• General & Administrative Support

Near-Term…

• Manufacturing-Line Operators
• Assembly-Room Operators

24 to 36 Months…

• Field Service Technicians
Results of Intern Program…

10 Interns

5 Employees

2 Pursuing BS Mech-Eng
In Summary – The value and benefits:

• Developing the “people” supply-chain
• Curriculum is directly related to industrial work
• Curriculum is being developed for the future needs of industry
• Knowledge Transfer…experienced team members transferring knowledge and skills to interns; and
• Education coupled with innovation…tomorrow’s generation working in industry today

You get of the program and relationship…what all parties put in to it!!
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Dorey Diab, Ph.D.

Provost and Chief Academic Officer
Stark State College
Value and Benefits to Stark State College - Curriculum

- College has become a leader in fuel cell education

- Stark State has created a fuel cell certificate and associate degree option
  - 15 students are currently in the program
  - 4 students have received a one-year fuel cell certificate
  - 7 students are currently in internships with 2 companies
  - 5 previous internships have turned into full-time jobs with RRFCS-US.

- Stark State developed high school competencies for teachers and students to provide a seamless tech prep program with hands-on activities from high school to college
Value and Benefits to Stark State College: New Partnerships

• **Promotes additional interest in SSC as a public partner**
  - **Lockheed Martin MS2**: Development of compact/transportable 1kW fuel cells for military application
  - **Contained Energy**: Development of large-scale fuel cell units for electrical grid applications

• **New partnerships under development include:**
  - **The Timken Company**: Ultra Large Wind Turbine Bearing Development and Testing
  - **Kohler Coating**: Energy efficient/environmentally friendly corrugated box packaging processes
  - **Will-Burt Company**: advanced materials welding and joining processes for military application
Value and Benefits to Stark State College - Reputation

• The project has generated high levels of cooperation among high schools, two-year colleges, public and private universities, businesses, state and local governments as they network together toward common economic and community development goals.

• The College became known nationally as 2 US Secretaries of Energy, Congressmen, Governors, and other dignitaries from public and private organizations visited the Fuel Cell Prototyping Center in recognition of its success.
Fall Term Enrollment Growth – 2003 to 2009

Note: Over the 7-yr time period, fall term enrollment increased 120%. Enrollment from Fall 2008 to Fall 2009 increased 32.87%.
Lessons Learned:

- Collaboration must happen because Community Colleges can no longer do it alone due to diminishing support for tuition reimbursement from the state.

- Collaboration allowed Stark State to provide world-class manufacturing development, system prototyping and testing capacity for Ohio emerging technology companies, and is actively linked to world-class research universities in fuel cell development.

- The comprehensive partnering of business, research universities, community colleges, and federal and state governments is the best synergy for workforce development and economic growth.
Lessons Learned:

• We are helping ourselves when we help businesses . . .
  • Achieve their commercialization goals
  • Transform the industry from traditional manufacturing to advanced manufacturing and a knowledge-based economy
  • Increase the number of high-quality jobs
  • Retain educated citizens in our community and state
  • Improve the standard of living in our communities
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It’s amazing what can happen… when a few organizations… start talking… and decide to collaborate!