



Entrepreneurship at Case Western Reserve University



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Survey of Business and Alumni

- Increasing need for individuals to be able to thrive in entrepreneurial environments
- There is a big gap between a student's knowledge and what is necessary to start a company (entrepreneurship), or be maximally effective in an existing company (intrapreneurship)
- There is an impedance mismatch between the culture of academia and that of the business world



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Practice Based Programs

- College of Arts and Sciences
 - Science and Technology Entrepreneurship Program (STEP)
- School of Engineering—The Institute for Management & Engineering-TIME
 - Masters of Engineering Management (MEM)



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**SCIENCE & TECHNOLOGY
ENTREPRENEURSHIP PROGRAM**



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Master of Science, Entrepreneurship Track

- Graduate-level Science
- Business
- Innovation & Strategy
- “Real World” Experience
- Resources & Networks



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Flexible Curriculum

- 4 core courses in 2 semesters
- Graduate-level Science course(s)
- Graduate-level Business course(s)
- Thesis similar to a business plan or Small Business Innovation Research Proposal
 - Grounded in the real world



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When Our Students Graduate...

- Project Manager – 25%
- Business Development Associate – 25%
- Entrepreneur/Self-Employed 25%
- Family Business – 10%
- MBA – 5%
- Program Manager – 5%
- PhD – 5%



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"Employee number four at Arteriocyte came to us originally as a commercialization assistant (intern) from STEP. His entrepreneurial "get it done" attitude, excellent problem solving skills, and knowledge of both science and business have been a critical asset to our startup. We have since hired five more STEP students, all who have been instrumental in the rapid growth of our company."

-Don Brown, CEO,
[Arteriocyte, Inc](#)



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Writing a Business Plan

Adele Luta



Timeline:

- 2005 wrote business plan for QED
- 2008 \$5M in revenue
- 2009 Forbes 11th Most Promising Company in America



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New Venture: Neomed Technologies

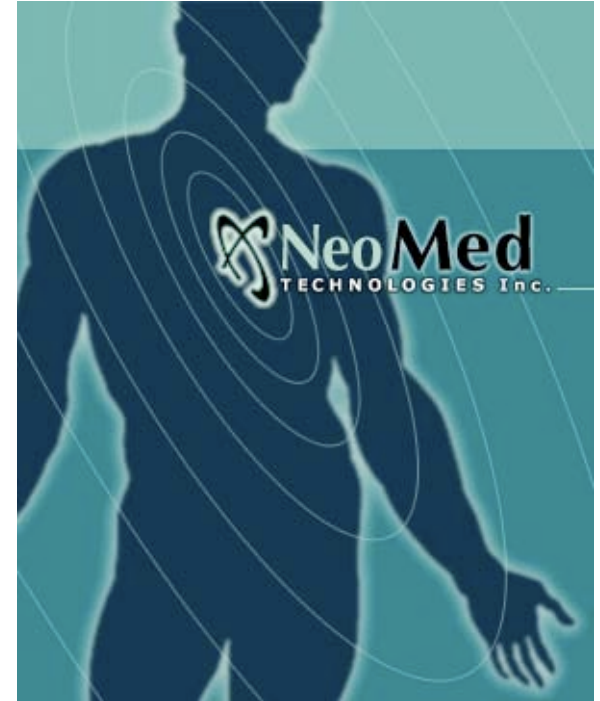
Marc Umeno PhD



Unique, non-invasive method
for detecting Coronary Artery Disease

Timeline:

- 2000 company formed
- FDA trials began in August 2005
- Product has not yet been released



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New Venture: The BREWLOO

Adam Hunnell



Portable Device
Keeps Kegs Cold
No Need for Ice

Timeline:

- 2003 Invention
- 2004 NCIIA E-team grant
- 2005 Prototype Demonstrated





New Venture: Superior Scientific

- **Christian Marin**



A leading supplier of tools for the
bioscience industry.

Created by scientists for scientists.

Timeline:

- 6 Months from Market Survey to First import from China
- Signed Several Licenses



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Working with a Company

ARTERIOCYTE

Yukang Zhao

Proprietary stem cell and tissue engineering based therapies

Timeline:

- 2006 CA (Intern): Key author or \$2M DARPA grant
- 2007 transferred Magellan business purchased from Medtronic
- Raised approximately \$7M to date
- Mentored 6 other CWRU CAs to date



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Working with a Company

- **Jeff Bargiel (right)**

Phycal: Oil from Algae

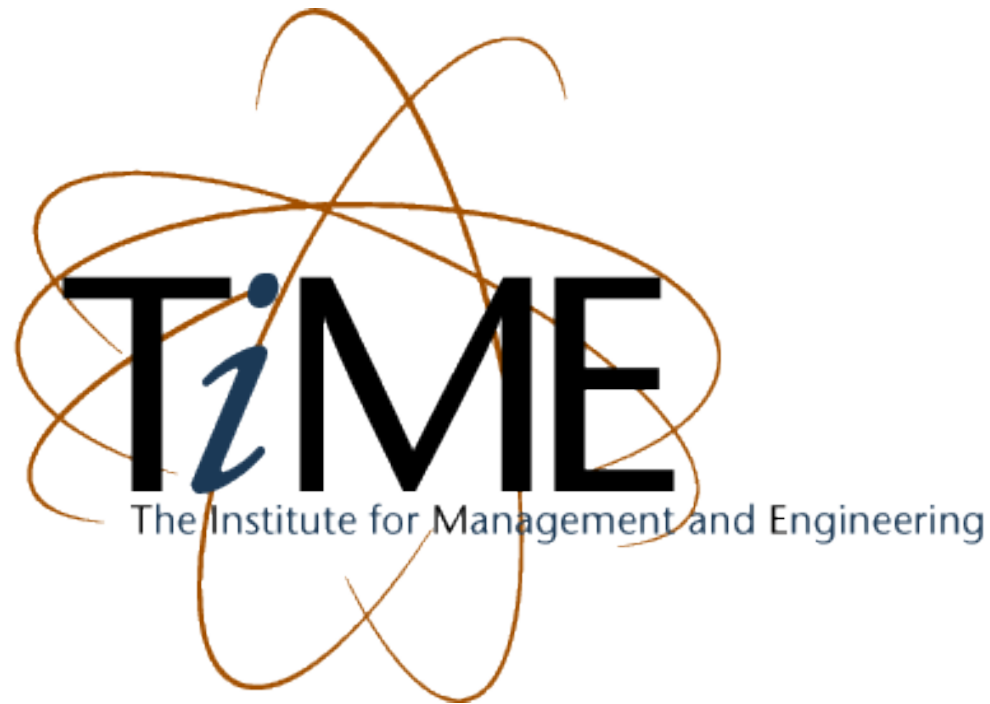
Timeline:

- 2007 hired as an intern
- 2008 hired full-time as Business Development Associate
- Raised approximately for Phycal \$7M to date



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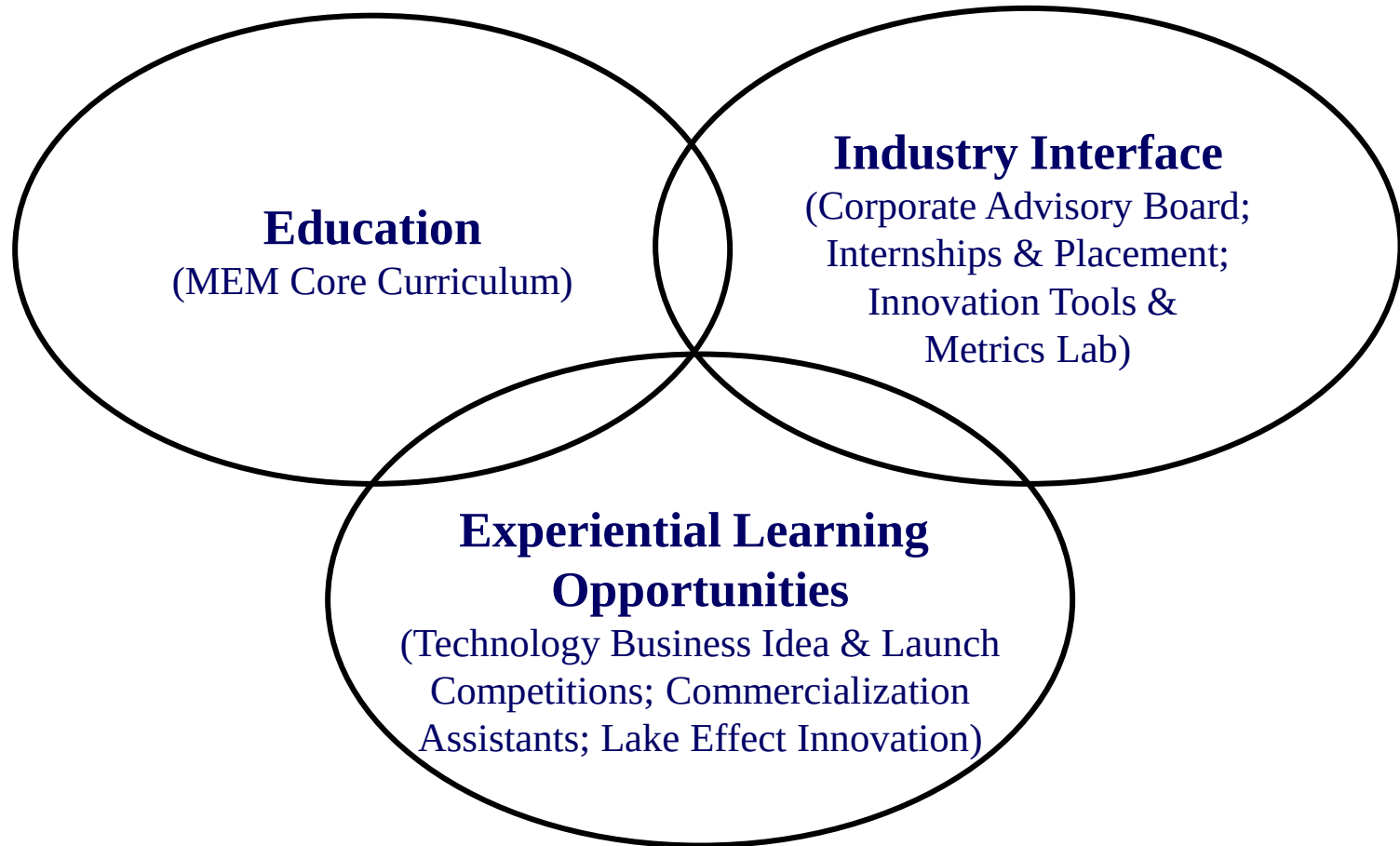
MEM-Master of Engineering and Management



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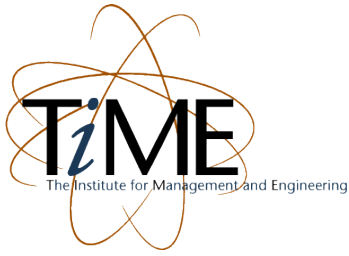
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Key Components of TiME



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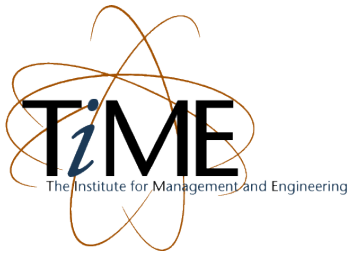
The MEM is different from traditional degree programs

- 12-month, 42-credit program (can begin at end of senior or junior yr)
- One degree, JOINTLY conferred by the Schools of Engineering and Management
- Not like an MS; professional degree rather than research
- Not like an MBA; integrates engineering with management
- Courses co-designed and co-taught by Engineering & Management faculty
– **importantly, integration of content is not left to the student**
- Diverse student body – different majors, nationalities, cultures, experiences, and interests – and much to learn from each other



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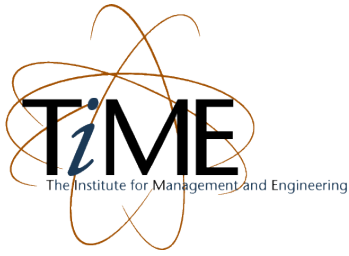
MEM Points of Distinction

- ***Integrated*** curriculum and faculty appointments provide and position students to acquire critical skills needed in engineering management tracks and leadership programs.
- ***Experiential*** real-world projects in product design, quality management, and entrepreneurship
- ***Growing*** Commercialization Associate (CA) Program provides valuable experiential learning, which enhances the curriculum in “real-time.”
- ***Unique*** value-added group experiences for the “business-minded” engineer such as *Lake Effect Innovation LLC*
- ***Accelerated*** career tracks and unique employment opportunities



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MEM Curriculum (3 Semesters)

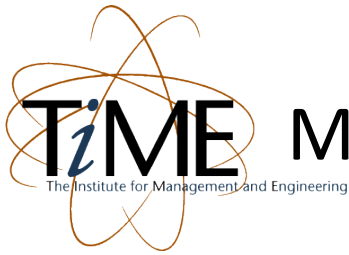
Course Title (Credits)

- Professional Development (3)
- Project Management (3)
- Materials and Manufacturing Processes (3)
- Accounting, Finance, and Engineering Economics (3)
- Product and Process Design, Development, Delivery (6)
- Design for Manufacturing and Manufacturing Management (3)
- Information Technology and Systems (3)
- Understanding People and Change in Organizations (3)
- Engineering Statistics and Quality (3)
- Engineering Entrepreneurship (6)
- Electives (6)



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MEM Biomedical Entrepreneurship Track

Course Title (Credits)

- Professional Development (3)
- Project Management (3)
- Materials and Manufacturing Processes (3)
- Accounting, Finance, and Engineering Economics (3)
- Product and Process Design, Development, Delivery (6)
- **Models of Health Care and Regulatory Affairs (3)**
- Information Technology and Systems (3)
- Understanding People and Change in Organizations (3)
- **Engineering Statistics with Biomedical Applications (3)**
- Engineering Entrepreneurship (6)
- Biomedical Engineering Electives (6)



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New Initiative



(Innovation, Design and Entrepreneurial
Activities) Institute and Network



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Project Uniqueness

- Distinctive project: truly integrates university and community resources and will help to reclaim Cleveland's innovation culture.
- Can impact all other Alliances and initiatives at CWRU: innovation, design and entrepreneurial thinking are foundational.
- Ultimate goal: iDEA helps to make Cleveland a global destination and model for how local resource integration can drive innovation.



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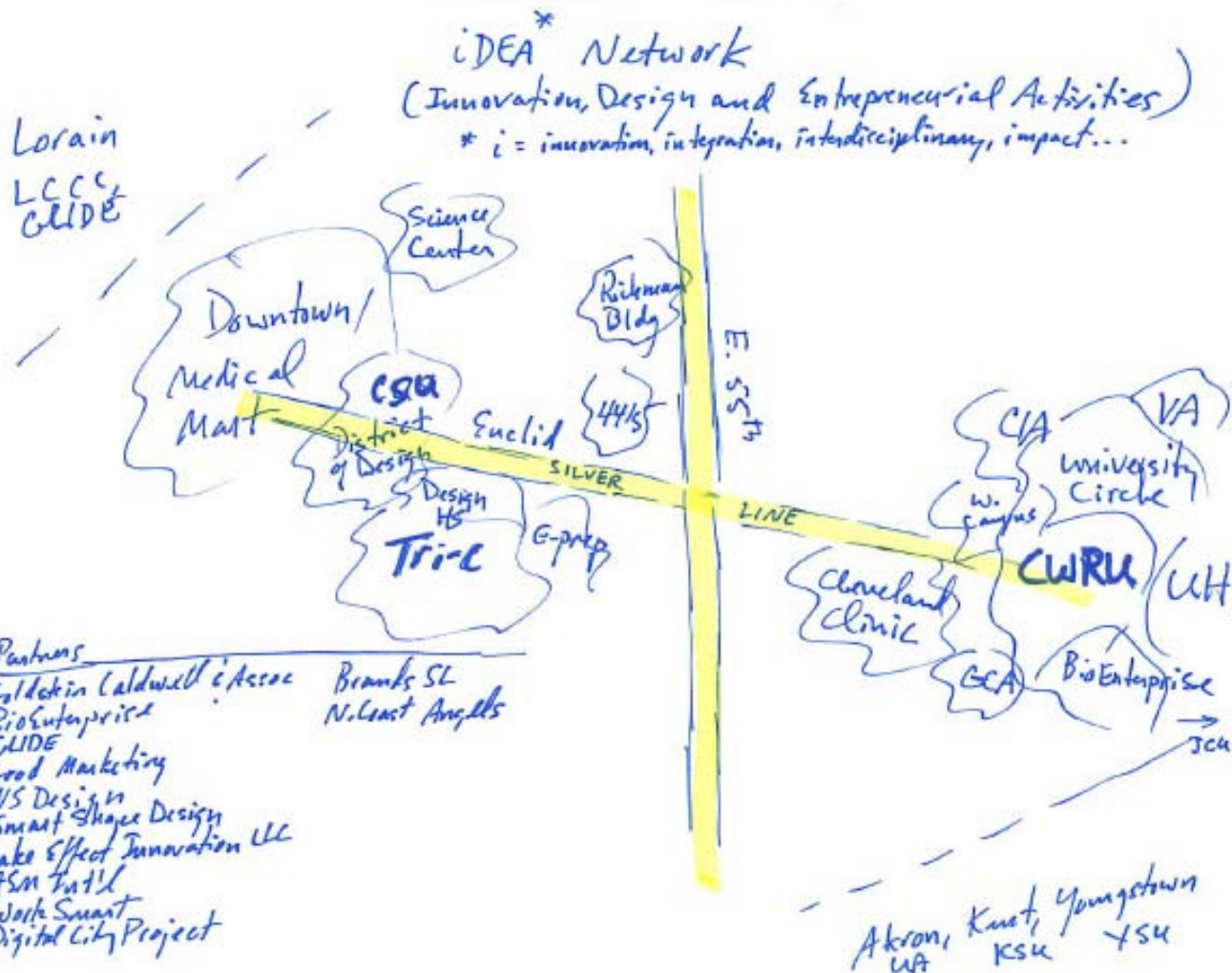
Project goals

- Educational: enhance experiential learning of CWRU students; enhance reputation as a destination of choice by students
- Economic: foster an innovation economy in Cleveland; create jobs and retain talent
- Societal: enhance connection of the university to the community
- Global: enhance Cleveland's visibility and role in a global innovation ecosystem



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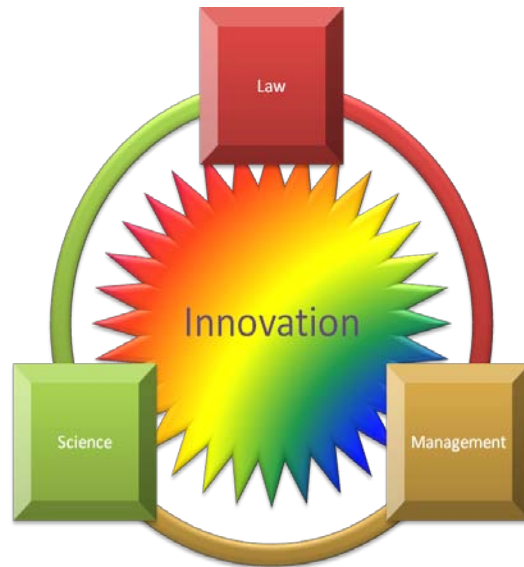
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New Initiative



Building Inter-Disciplinary Perspectives around the Management and Commercialization of Innovation

The goal of this initiative is to establish a nationally-distinctive academic program that blends legal, scientific, and business disciplines to drive thought leadership and guide students through the complex path of cultivating the commercial potential of complex scientific discovery.

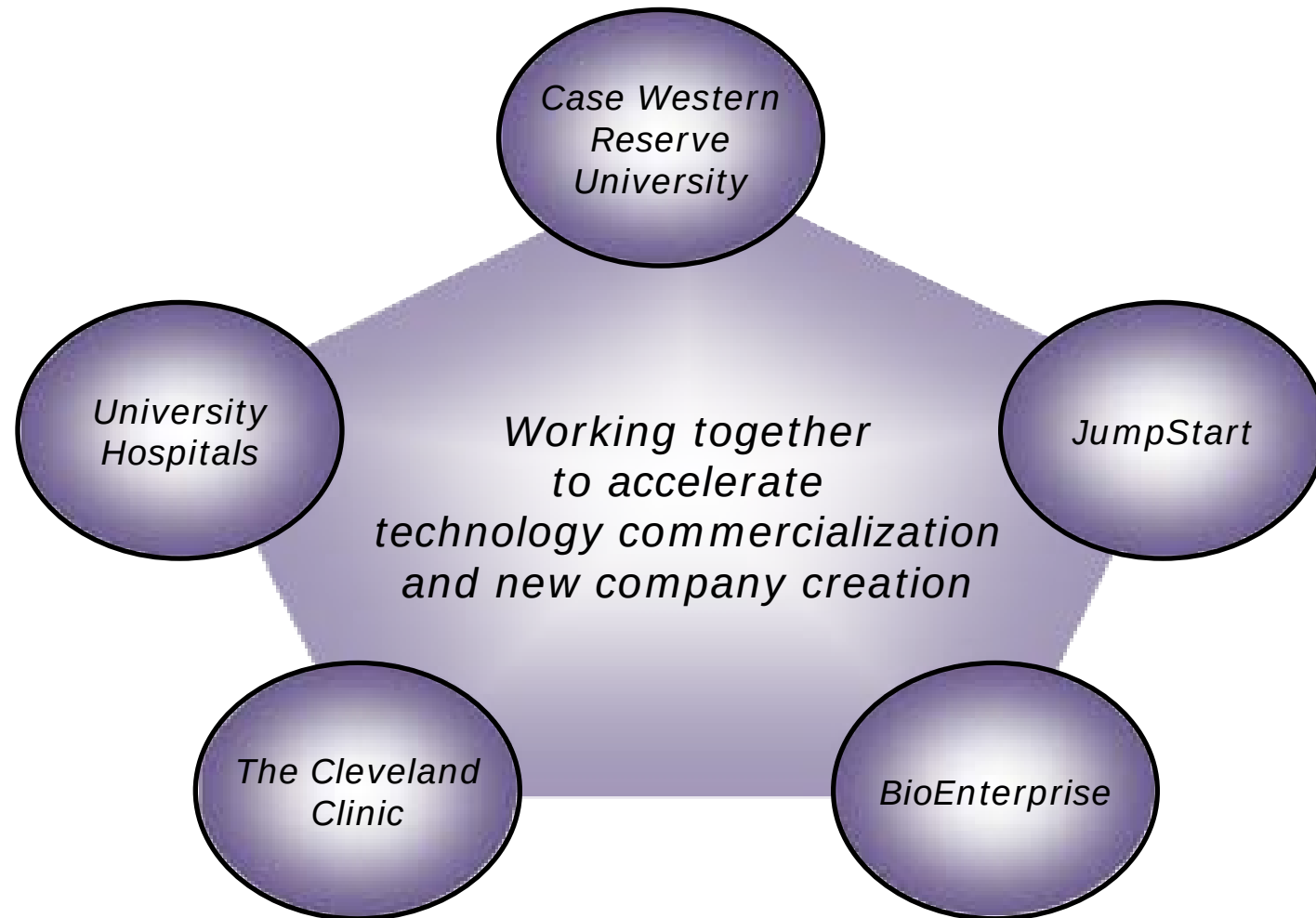
TAILORED TO CANDIDATES IN THE CWRU MBA, JD, AND SCIENCE/ENGINEERING PROGRAMS



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Innovation Network: Expanded Ties to the Region



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BioEnterprise



A Leader in Growing BioScience Companies

FOR ENTREPRENEURS | FOR INVESTORS | FOR MEDIA & COMMUNITY

OVERVIEW

SERVICES

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COMPANIES

WORKING TOGETHER

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Welcome to BioEnterprise

Overview

BioEnterprise is a business formation, recruitment, and acceleration initiative designed to grow health care companies and commercialize bioscience technologies. Based in Cleveland, BioEnterprise's founders and partners are The Cleveland Clinic, University Hospitals, Case Western Reserve University, and Summa Health System. The initiative comprises the collective activities of BioEnterprise and its partners' commercialization offices: the [Case Office of Technology Transfer](#), [Cleveland Clinic Innovations](#), [University Hospitals Case Medical Center - Center for Clinical Research](#) and Summa Enterprise Group.

Companies include emerging medical device, biotechnology, and health care services firms. Each year, the BioEnterprise groups choose a select number of companies on which to focus. The resources and networks of the BioEnterprise partners are directed to help those companies achieve greater levels of business success.

NEWS

Current news about BioEnterprise, Cleveland-area medical device, biotech, and health care software and services companies, and updates about health care venture activity in the Midwest.

OrthoHelix Raises \$7.3 Million from Venture Firms

Cardialysis, Global Cardiovascular CRO, Selects Cleveland for US Location

Great Lakes Pharmaceuticals Completes Venture Round

Brazilian Cardiovascular Company Will Open R&D Center in Cleveland

Three National Health Care VCs Establish Ohio Offices

MyriadHealth secures \$1.5 million



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Jump Start



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Grow.

JumpStart **funds** high-growth businesses and ideas, works with their founders to **develop** the businesses into venture-ready entities *and simultaneously celebrates* Northeast Ohio's early-stage company successes.

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events



05.10.08 - 05.29.08
Consortium of African American Organizations: Online Executive Auction

05.15.08 - 06.04.08
Federal Grants for Start-Up Companies

05.22.08
Great Idea Generation

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Technology Transfer and Commercialization

CWRU-Funded Start Ups:

Cardiovascular



Medical Devices



Cellular Therapies & Specialty Pharma



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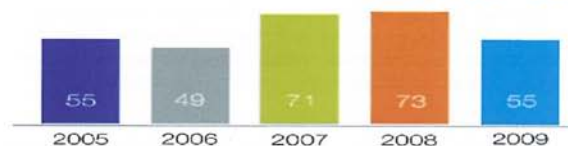
The 2009 Venture Capital Report for the Cleveland Plus™ Region

For Investors

Over \$1 Billion of Venture Capital Has Been Invested in 183 Companies in the Cleveland Plus™ Region in the Past Five Years.



183 Unique Companies
Received Investment in the Past Five Years



Top 10

Ohio became a top quartile state for venture investment activity in 2008, and moved into the Top 10 in 2009.

The Capital Continuum in the Cleveland Plus Region is Thriving

INVESTMENTS BY STAGE
[2005-2009]

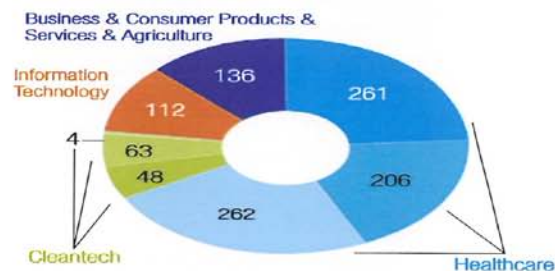


Nationwide, investors are talking about the strong investment ecosystem in the Cleveland Plus region.

Venture Investment Over the Past Five Years Has Been Anchored by the Region's Key Sectors

- **67% of capital invested in the region has been invested in healthcare companies.** \$729 million has been invested in 69 healthcare companies.
- **Cleantech is the fastest growing sector, with dollars invested increasing nearly 3x.** \$115 million has been invested in 33 cleantech companies.

EQUITY INVESTMENTS BY SECTOR
[\$ Millions 2005-2009]



NUMBER OF COMPANIES BY SECTOR
[2005-2009]

