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**The Economic Impact of a Major
Comprehensive Research University –
The Case Western Reserve University
Model**

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Importance of Major Research Universities

- The primary driver of the future economy and job creation will be innovation, largely driven by science and engineering (Gathering Storm Report)
- Global economic competitiveness requires the confluence of scientific discovery that creates knowledge and technological opportunity, workforce talent, and access to enabling resources.
- Universities can contribute to all of these components; over past decade, NE Ohio has embraced this concept and CWRU and its partners continue to both invest in and produce innovation successes.

Value Creation by University Research Engines

Select contributions of U.S. research institutions to the national economy:

- 2009: >3,300 patents issued to universities.
- More than \$40 billion and 270,000 jobs added annually to U.S. economy.
- More than 500 companies formed annually around university discoveries.
- Impactful products and interventions such as Google and Rituxan

CWRU's Approach to Economic Development

- *Institutional Strategic Focus and Prioritization*
- *Talent:* CWRU educates thousands of talented students annually in disciplines innately tied to growth sector opportunities.
- *Technological Opportunities:* CWRU is a vibrant research institution with nearly \$400 M/yr in research
- *Enabling Resources:* CWRU partners with industry, regional institutions, foundations and state and local governments to provide best-of-class technology advancement resources – thereby supporting an enabling and attractive Innovation Ecosystem

Educating the Leaders of Tomorrow with an Innovation and Entrepreneurial Mindset

- Base of ~10,000 undergraduate and graduate students, with nationally-ranked programs in medicine (#22), engineering and business.
- Professional degree programs coupling basic and applied, problem-based interdisciplinary research with training at premier healthcare and corporate partners sites.
- Cutting-edge interdisciplinary graduate programs and curriculum aimed at preparing high-achieving engineering and professional degree students for careers in innovation, entrepreneurship, and technology commercialization

CWRU – A Leading Research Institution



Primary Research Areas

- Health and Medicine
- Specialty Materials
- Energy

Research Funding

- > \$385 Million in 2009-10
- Traditional Funding Sources
 - National Institutes of Health
 - National Science Foundation
 - Department of Defense
- Modern Program Partnerships
 - Industry collaboration
 - State and local government
 - Foundations

NSF Center for Layered Polymeric Systems

- “CLiPS” is one of 17 National NSF Science & Technology Centers - \$20M over first 5 years
- Led by CWRU, the partnerships includes the Office of Naval Research, UT Austin and several other national universities, and numerous corporations
- Program integrates interdisciplinary research and education toward both product opportunities and workforce diversity.
- Spin-off of PolymerPlus, LLC to translate CLiPS R&D into commercially viable technologies and products



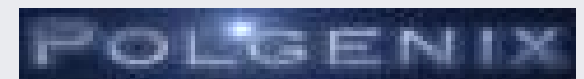
Swagelok Center for Surface Analysis of Materials

- Multi-user analytical facility at CWRU providing access to a wide range of materials surface characterization techniques for both academic and industrial clients.
- Home to a myriad of NE Ohio clients, enabling commercial access to cutting-edge technical infrastructure.



CWRU Medical School and Clinical Partners

- More than 20 active life science companies have been spun-off of CWRU bioscience research in the past decade.
- Additionally, CWRU bioscience leaders have a demonstrable impact on regional firms that have imported technological opportunities to Northeast Ohio.
- Areas of particular activity include biomedical imaging, cellular therapies and neural engineering.



Enabling Resources

- CWRU is home to more than 40 professionals focused on expanding and capitalizing on our research activities and partnerships.
- Our technology transfer office has emerged in the recent years as a nationally-ranked program for transferring intellectual assets to society.
- Member of NE Ohio “Innovation Network” that is a source of continued economic growth and acclaim.

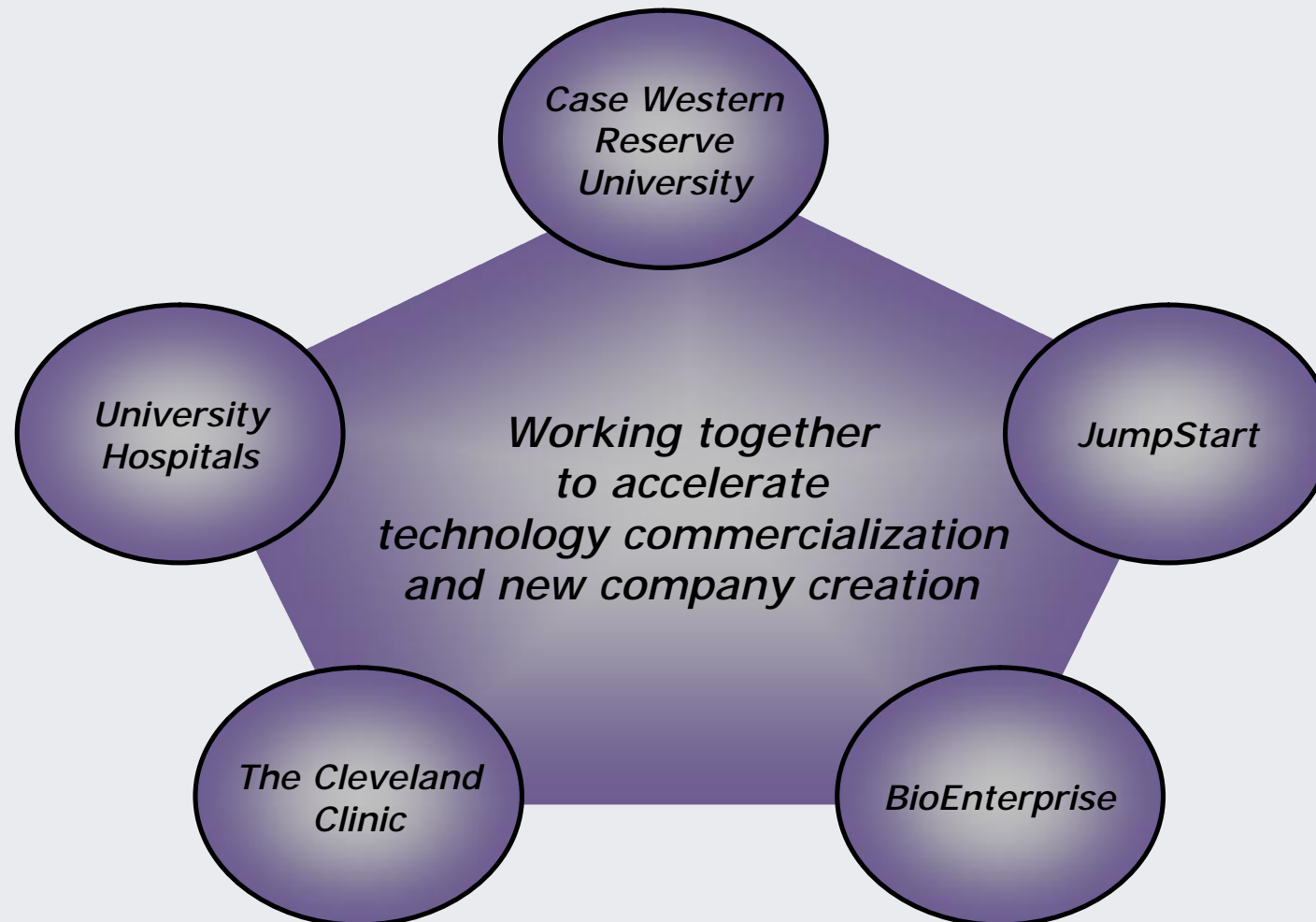
CWRU Technology Transfer

Nationally-ranked Technology Transfer Office



- Ranks in Top 20 in its national peer group categories including company creation, revenue, invention disclosures, licenses and options, revenue, and cumulative licenses.
- The TTO manages the University's pre-seed fund, Case Tech Ventures, that since 2003 has provided first capital to 8 regional technology startups.

Innovation Network: Expanded Ties to the Region



BioEnterprise Initiative



Vision

- Make region a nationally recognized center for health care innovation and commercialization (e.g., Research Triangle)

Strategies

- Create, accelerate, and retain start-ups
- Catalyze industry-accelerating initiatives

Performance Metric and Target

- Capital raised by health care companies in region
>\$150 million invested in region annually

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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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Ohio Third Frontier Programs

- The State program for technology-based development has invested strongly in CWRU and its aligned commercial partners for the past decade.
- Highlights of this public-private partnership include:
 - Center for Stem Cell and Regenerative Medicine
 - Ohio Wind Energy Research and Commercialization Center (WERC)
 - Clinically Applied Rehabilitation Engineering (CARE)
 - Mirror-Augmented Solar Photovoltaic Systems

Summarizing Our Successes

Select outcomes:

- Stable of 20+ for-profits active in the region;
- More than 200 active licenses with industry;
- Novel multi-party collaborations in advanced energy, clinical translation and imaging.
- Many first-in-man clinical interventions based on CWRU technologies and executed by our spinoffs and clinical partners.



Challenges

- Innovation and Entrepreneurship are global, increasing competition for everyone – we must continue to invest in the three key ingredients, people, knowledge and an innovation enabling environment
- Value creation and economic growth through discovery and translation to innovation and commercialization is a complex, non-linear and often lengthy process.
- University support and rewards system for faculty must more effectively support strategies and goals in technology commercialization
- As a key partner, universities must continue to enhance their efficiencies and flexibility in supporting the innovation enterprise

Thank You!

Case Western Reserve University

To learn more, please visit our web site:

<http://www.case.edu/provost/>

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