

Massachusetts: Innovation Gateway-Global Education Center

Beyond Parallel Play?

Universities, Industry and Regional Economic Development

Cambridge University
October 12, 2007

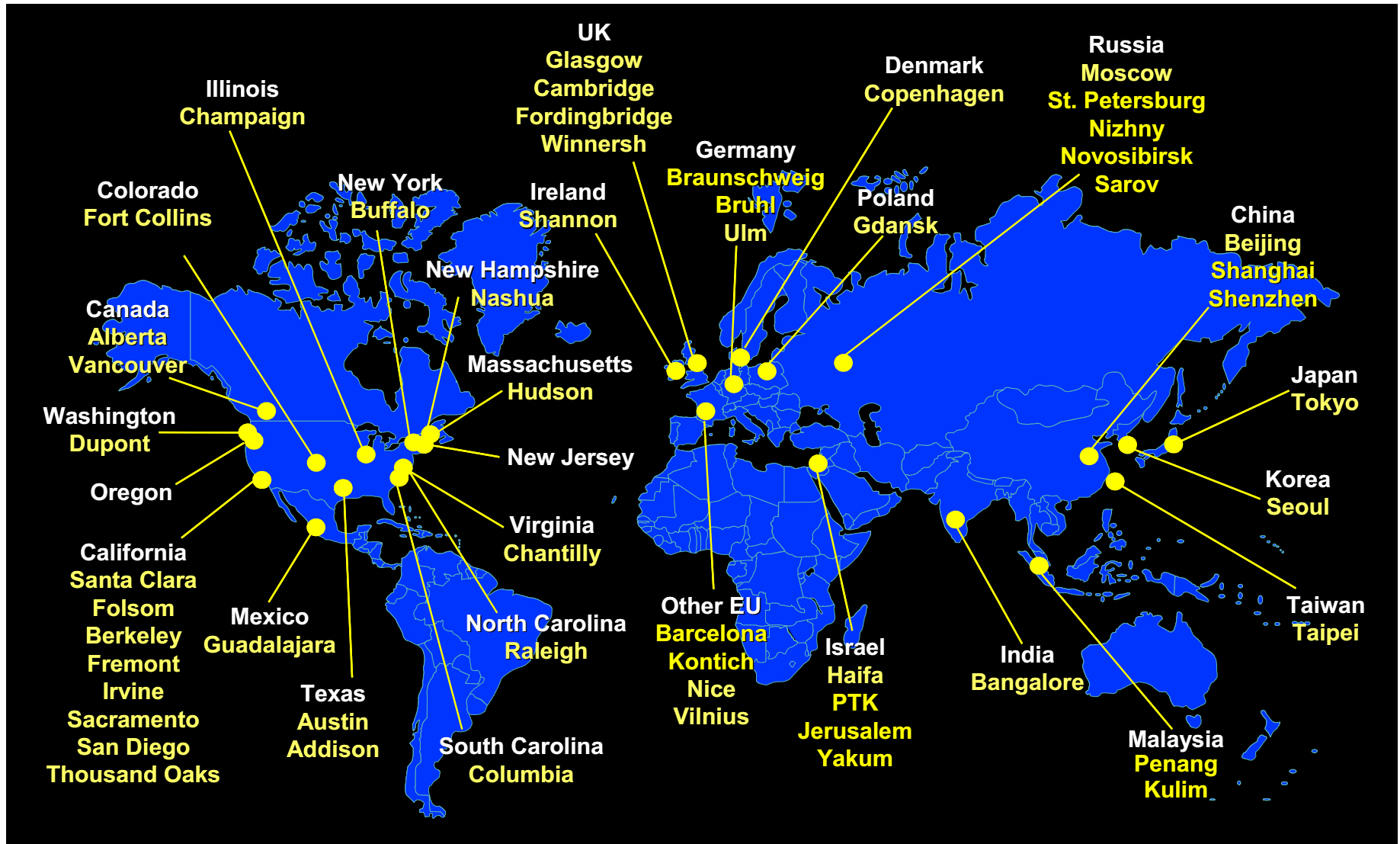
William Guenther
President, Mass Insight Corporation



Re-defining economic strategy

If you have the **talent...**
the jobs will come.

Intel Worldwide R&D Locations



Talent and innovation-based economic strategy:

A conceptual framework



Talent clusters support and attract business

Talent clusters are concentrated geographic pools of talent focused on a particular technology or specialized discipline.

- **Proximity** still matters
- **Critical mass** is important
- Clusters need **stars** and **supporting talent**



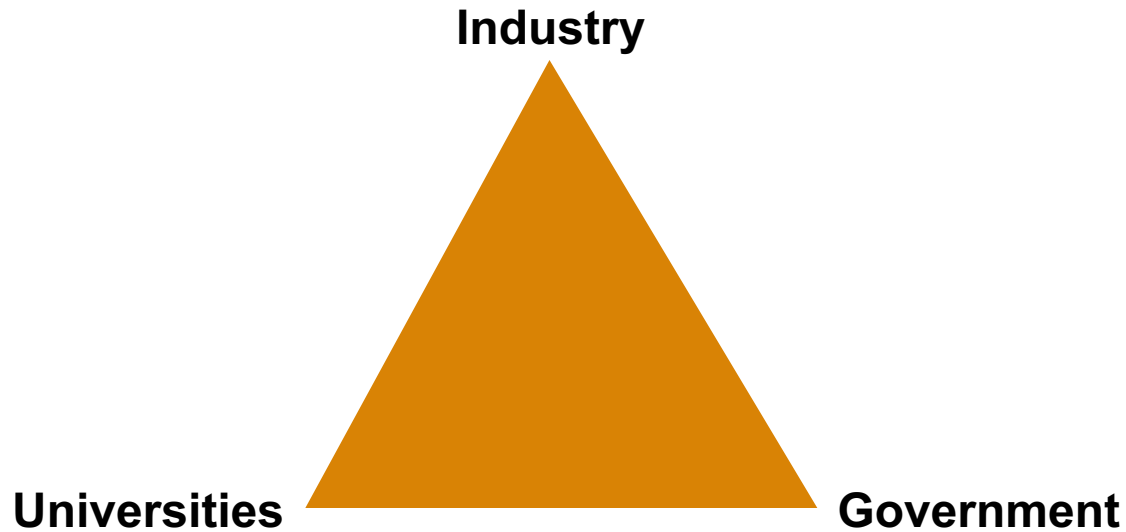
The opportunity for knowledge regions: Innovation Gateway – Global Education Center

- As R&D follows manufacturing around the world, regions which are global innovation leaders will act as **gateways** – integrators of worldwide clusters of talent.
- Innovation gateways will be **global talent leaders**.
- **Global education and training programs** – in higher education *and* industry – are critical to recruit and develop the pipeline of students and 22-30 year olds to support talent clusters.



The Innovation Triangle

Strategic alliances are the key to R&D leadership and economic growth



Context: Changes in the innovation eco-system drive strategic university-industry alliances

- **“Open” innovation** – Decline of internal corporate labs, corporate alliances between large and small companies
- **Technology convergence** – Innovation occurring through multi-disciplinary collaborations
- **Shared intellectual resources and facilities** – Science budgets outstrip individual capabilities and funding
- **Applied science rises** – Academic paradigm shifts as funding focuses on applications; basic science is embedded

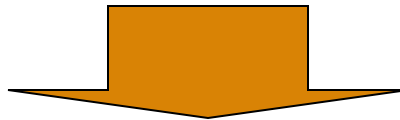
Talent and innovation-based economic strategy:

Four steps for a strategy



A regional talent and innovation-based strategy: Four organizing steps

1. **Focus** – You can't win at everything
2. **Talent** – Higher education linked to industry
3. **Regional Alliances** – Strategy to connect assets



4. **Global Partnerships** – Need China/India/Asia strategy

Universities and Industry: Beyond Parallel Play

The Role of Innovation Centers

3 Cases



Bridging the academic–industry divide

Four mechanisms that make a difference:

- Supported **networks**
- Innovation **centers of excellence**
- **Matching funds** for collaborations
- **Endowed professorships** in targeted areas (better in teams with incentives to collaborate with industry)

Large-scale innovation centers create a comparative advantage – and a new culture

Connect assets through regional alliances, global partnerships to:

- **Lead in science**
- **Lead in education** – Develop/recruit local, global talent
- Create jobs – **Recruit and spawn companies**
- **Commercialize innovation**, create applications
- Compete for **national funding**



State Street and Zhejiang University/Hangzhou

The Partners

- **State Street:** investment management and services
- **Zhejiang:** a leader in computer science, over 40,000 undergraduates; 6,000 PhD students near Shanghai

The Business Challenge

- IT applications: Re-engineer old mainframe applications and convert them to current platforms



State Street and Zhejiang University: The evolution of a relationship

- **Late 90s: Personal contacts matter.** State Street knows the founder of Zhejiang's computer science department – a few graduate students begin work on IT projects.
- **2001: A small technology center with part time students/staff.** 3 computer science professors spend 8 months in Boston to learn State Street's IT development. The company commits to a small university-linked IT center where students work on advanced applications.
- **2003: A separate commercial operation.** To retain staff after graduation, State Street establishes a separate commercial technology center for its internal functions. This leads to a Chinese joint venture for outsourcing to other customers.

State Street and Zhejiang University: The impact of a relationship

State Street: Corporate citizen and university supporter

- Moving towards 1,000 employees; over 200 full-time
- Global philanthropy invests in the community
- American executive learns Mandarin, moves to Hangzhou in 2007
- State Street builds a talent cluster – and a base in China

Zhejiang University

- Over 50 related academic papers
- Graduate students/undergraduates gain education and employment opportunities
- Increasing visibility and regional development

University of California System Initiatives

Industry-University Cooperative Research

Outcomes: New research monies
Widened participation
in I-U research
New educational opps
Economic res. team
Faculty recruitment
Awareness of UC role
Expanded R&D capacity
Experience

California Institutes for Science and Innovation

7+ major buildings
\$400 million (state)
\$1.6 billion (fed, industry)
Faculty recruitment
Student recruitment
New paradigms
Economic Research
Experience

Stem Cell Initiative

Nothing directly, yet
Worldwide attention
Excitement
Faculty recruitment
Experience

(From a presentation by Susanne Huttner, UCal Associate Vice Provost for Research)



California Institutes for Science and Innovation

Each \$300 Million: \$100 million of state funding plus 2-1 match of federal/private funds.

- California Institute for Telecommunications and Information Technology (UC San Diego / UC Irvine)
- California NanoSystems Institute (UCLA / UC Santa Barbara)
- California Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research (UC San Francisco / UC Berkeley / UC Santa Cruz)
- Center for Information Technology Research in the Interest of Society (UC Berkeley / UC Davis / UC Santa Cruz / UC Merced)



California Institutes for Science and Innovation

Research

- Tackling major challenges, large scale societal problems
 - Healthcare
 - Energy
 - Environment
 - Transportation
 - Civil Infrastructure
 - Homeland Security
- Creating foundations for new R&D economy sectors
- Injecting innovative technologies into “old economy”

California Institutes for Science and Innovation

21st Century Education

- Students are enthusiastic about the paradigm shift
- Seamlessly integrating a multi-disciplinary, use-inspired research focus
- Producing a new generation of cross-trained researchers/experts

California Institutes for Science and Innovation

Innovation/Research and the Economy

- DMZ between industry, government, and academia
- Persistent dynamic frameworks for:
 - collaboration across traditional disciplinary and institutional boundaries
 - linking fundamental discoveries directly to development of new products and new technologies

California Institutes for Science and Innovation

Federal Funding

The Institutes have created world class programs, such as:

- synthetic biology (Berkeley Center for Synthetic Biology)
- biological and medical imaging (California Regional NMR Facility, GE MRI Collaboration, Small Molecule Ligand Discovery Center, Bay Area Laboratories for Integrating Nanotechnology and Cancer)
- trusted systems (TRUST)
- embedded systems (CHESS)
- homeland security (RESCUE, WIISARD)
- sensor webs and Smart Dust (CENS)
- optical networking (OptIPuter)
- wireless communications (low power, ultra-wideband, CalRadio)
- information and communication technologies for the 3rd world (ICT4B)

The Massachusetts experience

Why we acted...

A deep technology recession and
a series of warning signs.

Leaks in the tires but no blowout.

Where we focused

Science and Innovation Initiative - 6 years of effort focused on :




- Talent and technology-based competition
 - Building up UMass role in regional development
 - Expanding alliances between public and private universities/industry
- **Networks and Alliances – Organize Champions**
 - Partnership of universities, industry leaders, tech groups
 - Shape state policy and support flagship R&D centers
 - **Match Funds: State Economic Package – 2004**
 - John Adams Innovation Institute: Match funds as incentives for collaborations, leverage for federal/industry \$
 - **Technology Road Map: *Choosing to Lead* – 2004**
 - Mass Insight/Battelle technology audit and road map to guide investments

Technology Road Map Phase I: Audit

10 core technologies identified

- Advanced Materials
- Signal Processing
- Computer Sciences
- Sensing, Optical and Electromechanical Devices
- Environmental Sciences
- Genomics & Proteomics
- Disease Research and Drug Discovery
- Biomedical Devices and Instrumentation
- Renewable Energy
- Nanotechnology Fabrication

Nanoscale Fabrication: A strategic alliance opportunity matrix

Core Technology Focus		<ul style="list-style-type: none">-Advanced Materials-Sensing, Optical, Electromech.-Life Sciences
Industries affected		<ul style="list-style-type: none">-IT and Telecom-Biotech and Medical Devices-Advanced Manufacturing
Regions affected		<ul style="list-style-type: none">-Northeast-Greater Boston-Pioneer Valley

Road Map Phase II: Implementation

R&D/Innovation Flagships – Global Challenge Centers

- **Goal:** \$50 million+ centers/collaborations, facilitate high impact proposals for new state match funds
- **Establishes technology leadership networks:** Stir up the marketplace, focus on major opportunities
- **Feasibility:** Federal and private funding, economic impact, project champions

Road Map Phase II example: Ocean Research

A Collaborative Ocean Monitoring Center

- **Goal:** National/regional collaborations to make Massachusetts a global center for the next generation of ocean monitoring and related R&D, industry activity
- **Partners/Work Group:** Woods Hole Oceanographic Institution (WHOI), MIT, UMass, leading industry co-chairs, state agency
- **Planning funds:** UMass president's fund, John Adams Innovation Institute
- **2007 \$100 million funding award:** WHOI, in partnership with Scripps/California wins National Science Foundation award



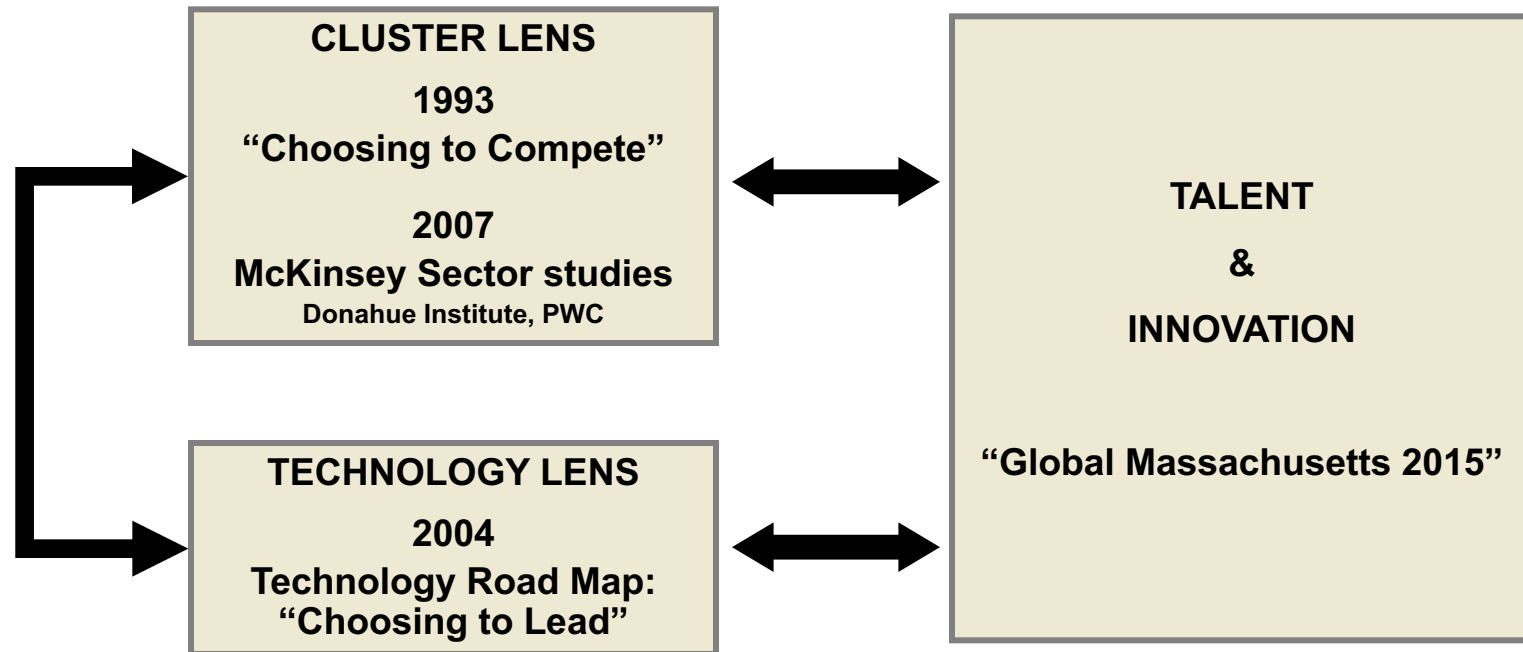
The Next Phase Global Massachusetts 2015:

Winning the Competition for Talent... and Innovation



A comprehensive economic development strategy

Linking higher education, industry, government



Bridging the academic–industry divide

Lessons learned.

Conventional wisdom,
culture and **politics** are hard to change.



Bridging the academic–industry divide

Focus on the people

- A talent cluster/people strategy: Industry generally wants talent more than tech transfer
- The tech transfer office is only one piece of the puzzle
- Culture/incentives in academia matter a great deal – does academia view business as the “dark side”?
- Bridging the divide won’t happen with volunteers



Bridging the academic–industry divide

Build centers.

- Leadership networks and connecting organizations.

Establish a framework for investment.

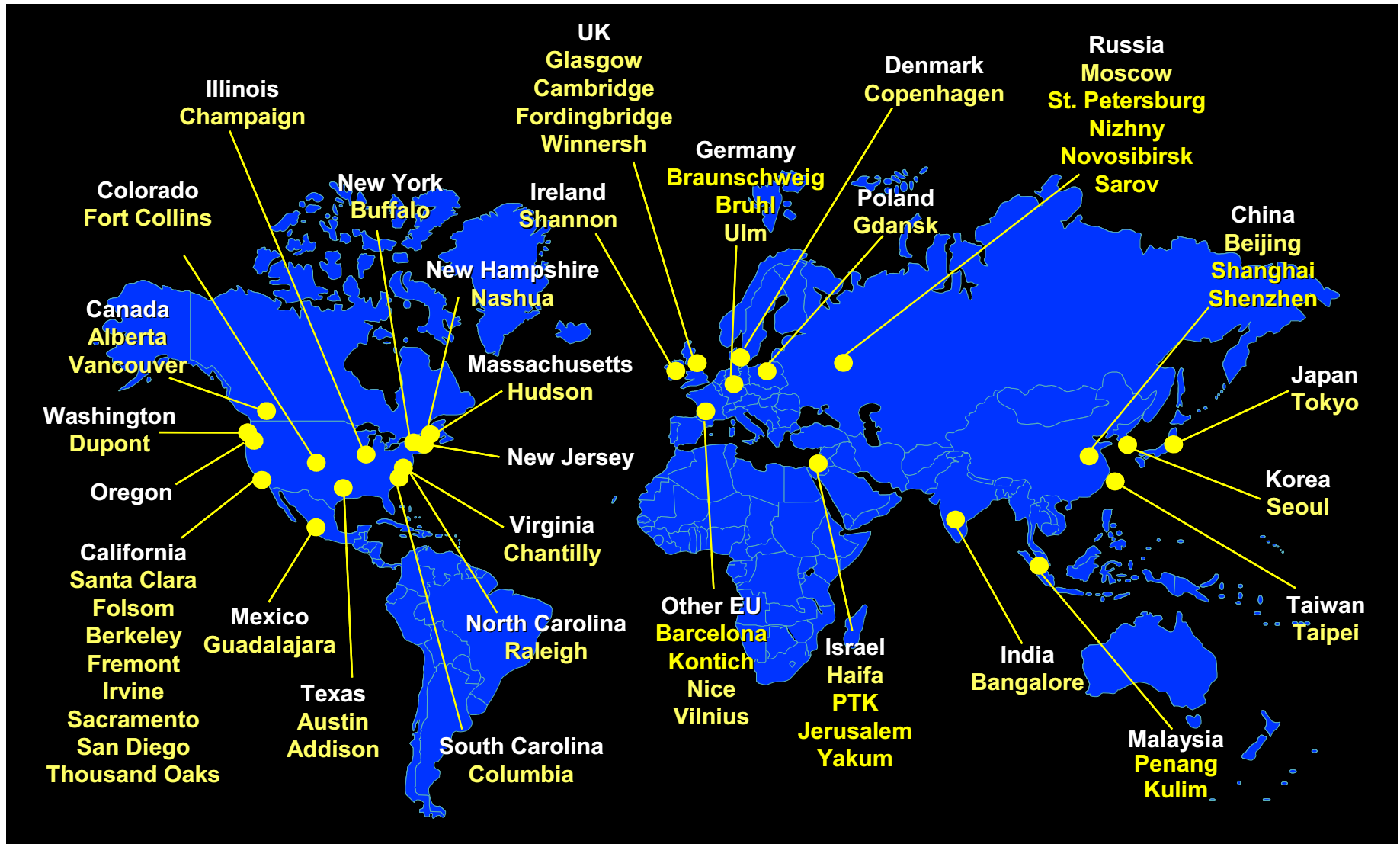
- Battelle's and McKinsey's research impact in Massachusetts.

Match funds, endowed professorships have an impact.

- Incentives for collaborations, even limited \$ create a conversation.



Global R&D Partnerships: Your place?





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