

PANEL 2: LAND DEVELOPMENT AND JOB CREATION

Guidelines for Building an Innovation Hub

Mary Jo Waits, National Governors Association



California State University
MONTEREY BAY
Extraordinary Opportunity



Key Considerations

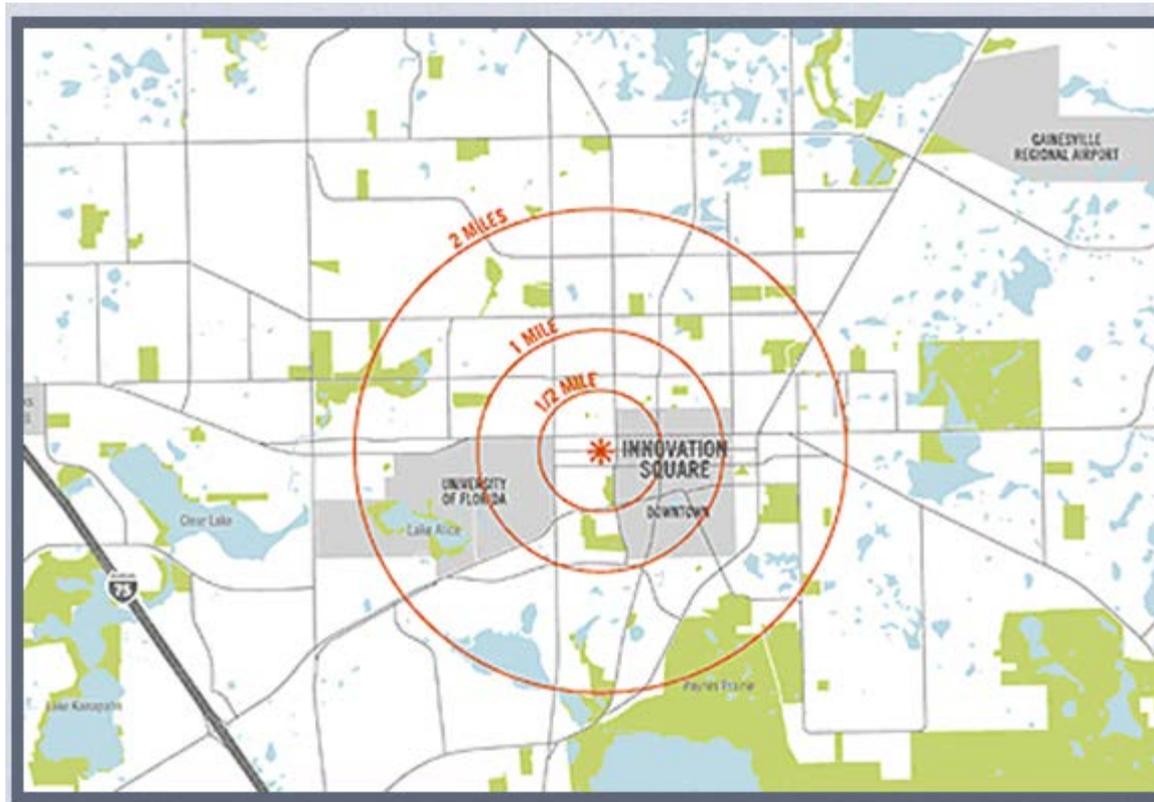
Becoming a regional center of innovation, technology commercialization and quality job creation

Can Learn from icon models (Research Triangle Park, Boston Pioneer Square, San Diego) and from a whole lot of new models (Downtown Phoenix, Centennial Park, Commonwealth Center for Advanced Manufacturing Innovation Zone)

A number of states and regions are creating Innovation Hubs, focusing on “eds & meds” and spaces around them



"As we envision it, Innovation Square will be unlike anything you've seen. In fact, it will be nothing short of a complete re-invention of the town square concept." - UF President Bernie Machen



What Will Be Key

More than a bricks and mortar approach to innovation hubs to....

.....a more complex one that involves developing a distinctive collection of people, firms, institutions, amenities, and relationships that combine in finely tuned ways to...

...encourage innovation, entrepreneurship, successful business development, and community revitalization, for sure, but also ensure a local economy that generates wealth and shares prosperity.

Innovation is Place-Based

Biotech Companies Clustered in Greater Kendall Square, Cambridge, Mass.

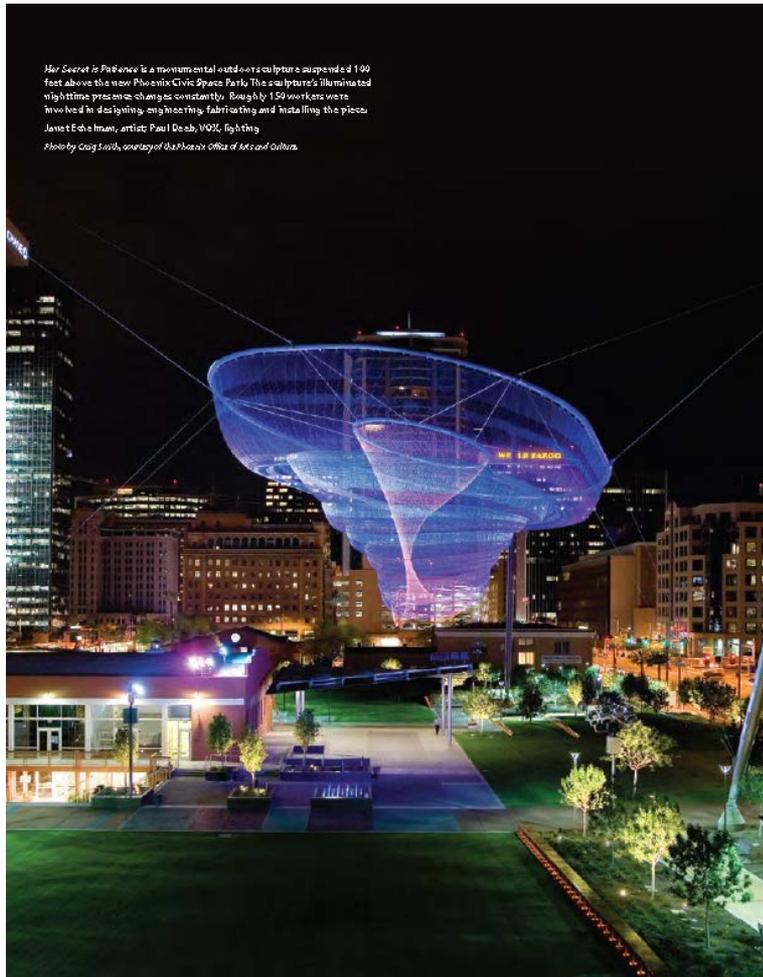


San Diego: Rise of a BioTech Cluster

- Today: 3rd Biotech hub behind San Francisco & Boston
- North Torrey Pines Road: Densely packed 2-mile stretch w/ Scripps Research Institute, Salk Institute for Biomedical Studies, UCSD
- “We can throw a rock and hit UCSD. I can hit a golf ball and hit Scripps. Everything is within walking distance. That means more heads get together and we do a lot of collaboration.”

VP at Salk Institute

Spaces to Cluster, Interact and Thrive



The most successful American places in the 21st century are likely to be innovation hubs. They are locations that support an open innovation business model, foster co-location, and promote easy and constant interaction among many different industries and a wide variety of creative workers, from artists to scientists to engineers.

New location priority: Spaces to Cluster, Interact and Thrive

What Will Be Key

- Looking at innovation hubs through an ecosystem or habitat lens and assembling a multidiscipline leadership team and partners to ensure that the region is being ambitious and comprehensive in taking on the core elements that drive innovation and, as a result, provide a competitive advantage for businesses and cities in a global economy;
- Reimagining the spaces around universities and medical research institutions as places that can be shaped physically and strategically to anchor an innovation ecosystem, providing all sorts of critical ingredients for innovation—smart people, research institutions, entrepreneurial training and mentors, professional networks as well as those place-making attributes (e.g., walkability, public spaces, and mixed land use) that are known to support innovation;

A Multidisciplinary Leadership team because....

Building an Innovation Hub is a Fusion of

- industry cluster development strategy,
- entrepreneurship strategy,
- arts, culture and design strategy,
- urban walkability and environmental sustainability strategy,
- community revitalization strategy

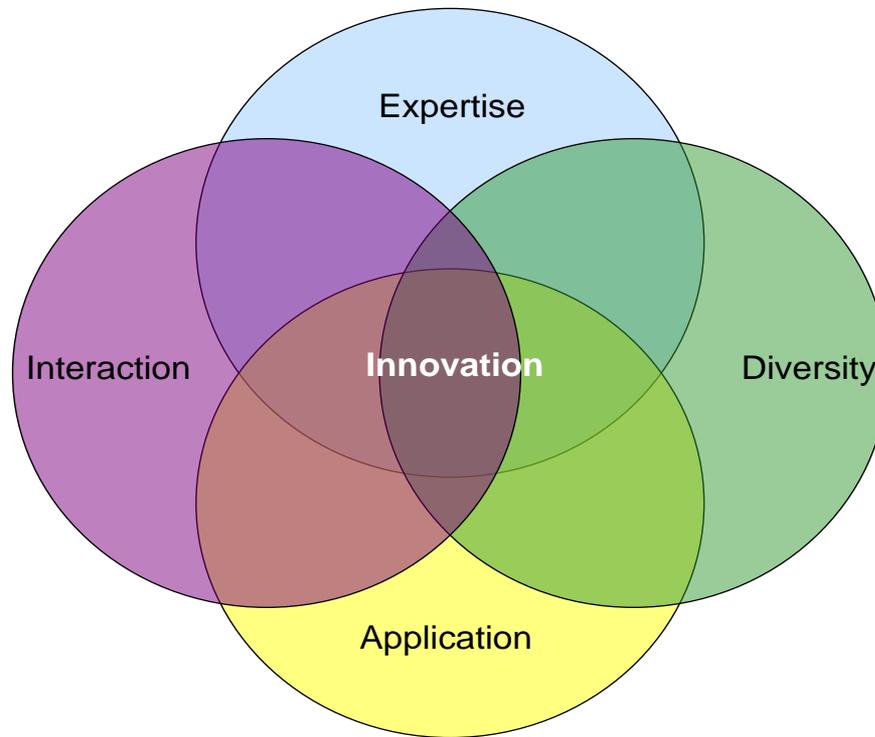
Elements of the Innovation Ecosystem

- Institutions that attract and support the people with the talent and foresight to create new ideas;
- Industry networks that encourage interaction, stimulate further innovation, help develop specialized services to support area companies, and encourage cross-industry partnerships;
- Facilitation of entrepreneurship to commercialize concepts so that ideas, and businesses based on them, grow in the area; and
- Cultural and social amenities constituting quality of life that motivate knowledge workers and the innovation-based companies that rely on them to stay in the area.

Source: Rosabeth Moss Kanter,
1995, Harvard Business School

Innovation Requires Four Things

The Four Components of Innovation



Strategic Framework for Policy Decisions and Investments

- **Build Expertise** by building strong research capabilities and attracting world-class talent in strategic areas.
- **Facilitate Interaction** by requiring collaboration among universities and others, cultivating strong networks, shared research facilities and compact geographical areas.
- **Link diverse knowledge fields and industry sectors together** by multidisciplinary institutions, well-designed research facilities, and mixed-use research parks to ensure that creative “sparks fly.”
- **Push the application of technology and commercialization of research** by experimenting with university-industry partnerships, pioneering open IP policies and faculty tenure changes, and keeping industry engaged.

Building Expertise

- **State-sponsored Research Funds:** CA, GA, TX, NJ, NY, MI, AZ, OH, OK, VA, WA, MD, KS
 - Build upon priorities of local industries
 - Emphasize applied research rather than basic research
 - Seed research that helps solve local problems (better health outcomes, economic transformation)
 - Align university priorities with economic development goals
- **Focused Excellence:** Re-enforce existing innovation clusters as well as developing new cluster--Arizona Bioscience Roadmap, CA Institutes for Science and Innovation
- **Research Talent:** Lilly Endowment's \$100 M for "intellectual capital," Georgia Research Alliance's 100 Eminent Scholars, Kentucky "Bucks for Brains" \$120 M in 1998, 2000 and 2005; Utah Science Technology & Research (USTAR) world-class research teams in 6 strategic areas, including nanotechnology, imaging technology, biomedical technology

Building Expertise

- **Workers and Skills:** Goals for higher education to meet STEM job needs; Credentials and Degrees for Veterans; Industry-education partnerships Automotive Manufacturing Technical Education Collaborative (AMTECH), Washington's 10 Centers of Excellence, each located at a community or technical college; Apprenticeship Carolina (SC) \$1M plus annual employer tax credits of \$1,000 per apprentice has more than doubled the number
- **New Fields and Young Talent:** ASU's new master's in genomics and biotech law; State University of New York, College of Nanoscale Science and Engineering, a global first, and center of excellence in nanoelectronics; Indiana's Polytechnic Institute Applied Bachelor Degree in 3-5 years starting in 11th grade; research funds marked for young investigators

Facilitating Interaction and Collaboration

- **Innovation Districts:** Atlanta's Technology Square, San Diego Torrey Pines, Research Triangle Park, PA's Keystone Innovation Zone, WA's Innovation Partnership Zones, Ohio Innovation Hubs; CA Institute for Quantitative Biosciences (QB3) San Francisco's Mission Bay
- **Mega-Partnerships:** Georgia Cancer Coalition, CITRIS combines 4 CA universities—Berkeley, Davis, Merced, Santa Cruz; CU-ICAR—Clemson University and BMW, Michelin and other partners for education and research; PA Nanotechnology Institute: 12 research institutions with over 4,000 researchers and \$1 B of research; more and more international partnerships; Commonwealth Center for Advanced Manufacturing (CCAM) to align research and education with industry needs/global standards
- **New Institutions/Intermediaries:** “Institutes of Collaboration” or Smart Agents—Oregon Nanoscience and Microtechnologies Institute (ONAMI), QB3, MA's Life Sciences Center, Science Foundation Arizona (SFAz)

Facilitating Interaction and Collaboration

- **Networks:** dense localized networks of trust, reciprocity and cooperation associated with robust innovation clusters—UCSD CONNECT “Meet the Researcher”, BIOCOM, Bay Area Science and Innovation Consortium (BASIC)
- **Shared Facilities:** MA’s High Performance Computing Center—state, 5 universities and companies; ASU’s supercomputer and engineering school moves to main street Tempe; test sites such as Verizon’s Innovation Center in Waltham, MA offers space, troubleshooting, and certification tools to partner companies creating advanced 4GLTE network applications, such as Ericsson, Cisco and Samsung
- **Small Wonders:** Balancing the need for new “big deals” (large research institutions, big entertainment venues) with the importance of keeping “small wonders” (authentic restaurants, public places, sustainability, cultural diversity) that not only encourage interaction between people but also promote people’s health, happiness, and well-being

Putting Diverse Knowledge Fields and Cultures Together

- AZ Biodesign Institute co-locates researchers from 3 fields designed for interaction, NC State Centennial Research Park, ASU SkySong-China, Georgia Tech-Korea Institute for Advancement of Technology
- Incentives (R&D funds, new colleges) to encourage cross-disciplinary research and interaction--University of Akron & P&G Bioinnovation Institute, linking materials science with biomedicine to become #1 in biomaterials and orthopedic research
- Right brain and left brain— Designers and Engineers (new ASU degree)
- Entrepreneurship across the university and particularly in S&T colleges
- Entrepreneurial “boot camps”—New England Clean Energy Council’s Clean Energy Fellowship Program, UC Davis
- Charismatic, Collaborative scientists and researchers
- **Silo, Solo is Passé**

Pushing Commercialization

- **University-industry Partnerships, Industry and Peer Review** —force an outside look (e.g., venture capitalists, out-of-state reviewers) WA Life Sciences Discovery Fund, SFAz, Utah Science Technology and Research (USTAR) “small-light-fast money” for startups and researchers
- **Focus on Problem-solving**—new energy sources, traffic congestion, chronic diseases (Proof of Relevance); solving common industry technological challenges
- **Industry Cluster Focus**—North Dakota State University’s Center of Excellence in Surface Protection, Delaware’s Center for Translational Cancer Research
- **Update Patent, IP, Tenure Policies**—master agreements to fit open-innovation business model, reward faculty entrepreneurs
- **Regulations and Procurement**— green technologies, energy efficiencies
- **Venture Financing**—Oregon, Maryland, Connecticut, United States Treasury Department’s \$1.5 billion State Small Business Credit Initiative (SSBCI)

Reinventing Downtown Phoenix

“Eds and Meds” Anchor an Innovation Hub

Downtown Phoenix

Seven Priority Themes

- Knowledge Anchors
- Downtown Living
- Great Neighborhoods
- Arts and Cultural Hub
- Distinctive Shopping
- Great Places/Great Spaces
- The Connected Oasis

2004 Vision

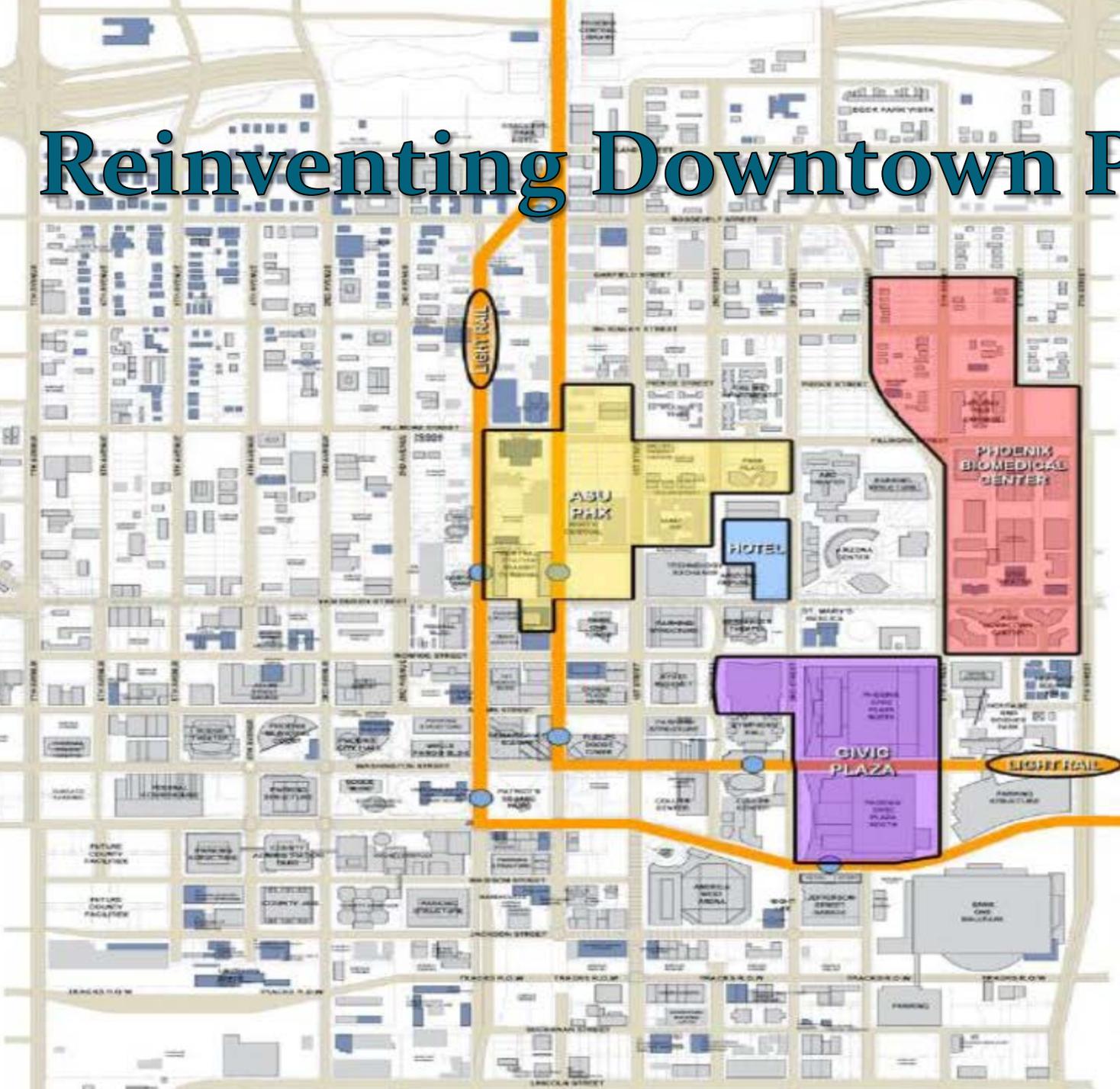
ASU Downtown Phoenix

20 acre mixed-use campus,
15,000 students, 4,000 student
housing, \$223 M investment

Phoenix Biomedical Campus

28 acres land, \$51 M for facility
for TGEN headquarters, \$7.5 M
bond funds for projects

Reinventing Downtown Phoenix




City of Phoenix
LARGE SCALE
INVESTMENTS
DECEMBER 2004

-  - LIGHT RAIL
-  - ASU PHX
-  - PHOENIX BIOMEDICAL CENTER
-  - CIVIC PLAZA
-  - HOTEL
-  - LIGHT RAIL STATIONS

Advanced Manufacturing Innovation Zone

INDUSTRY DRIVEN

- Multiple industry and university partners
- Applied research
- Industry-defined problems with easy transition of results to commercialization



UNIVERSITY DRIVEN

- Basic research
- Experimental engine test facility envisioned
- Results transition easily into CCAM



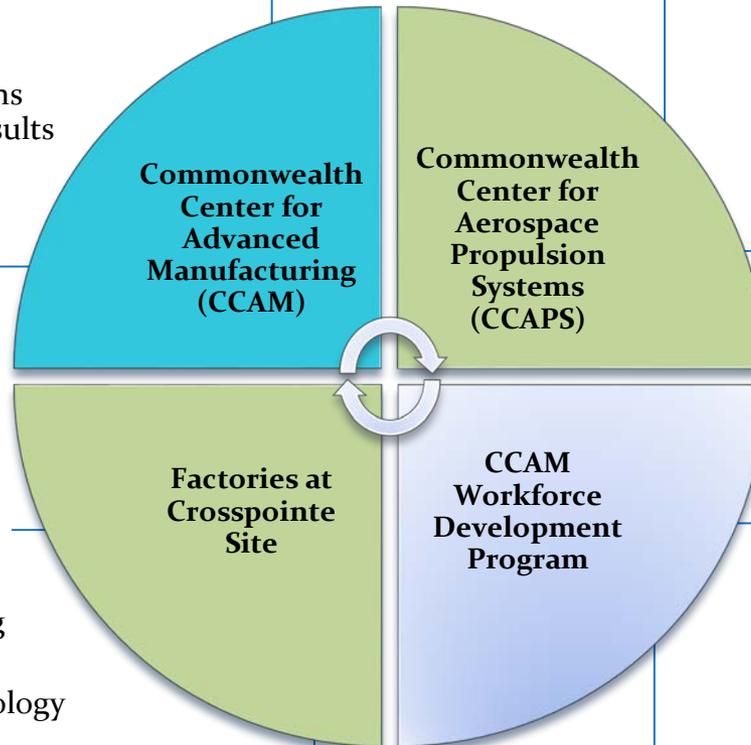
INDUSTRY OWNED AND OPERATED

- Advanced Manufacturing
- Operational Q1 2011
- Industry “pull” for technology and jobs



INDUSTRY / COMMUNITY COLLEGE DRIVEN

- Hands-on laboratory
- Industry applications
- Innovative, multi-faceted curricula



Partnership Elements and Support

Commonwealth of Virginia
\$40 Million
(Over 5 Years)

- **Manufacturing Programs**
- **Matching Research Funds**
- **Laboratory Renovations**
- **Faculty Hires**
- **Graduate Research Assistantships**
- **Undergraduate Student Interns**
- **Workforce Development**

Universities
\$10 Million
(Over 5 Years)

- **Faculty Hires**
- **Faculty Start-up Packages**
- **CCAM Start-up Funds**
- **Matching Research Funds**
- **New Manufacturing Courses**
- **CCAM Facility Design**
- **Research Equipment Funding**

Industry
> \$25 Million
(Over 5 Years)

- **Research Funds**
- **CCAM Member Fees**
- **CCAM Start-up Funds**
- **In-kind Start-up Support**
- **Workforce Development**
- **Student Internships**
- **Job Opportunities for Students**
- **Industry Relevant Problems to Drive Research**

Commonwealth Center for Advanced Manufacturing

- Bridge the gap between fundamental research and commercialization
 - Accelerate technology into markets
 - Demonstrate on real problems
- Foster collaboration among diverse industry sectors
 - Directed Research for the exclusive proprietary benefit of a member
 - Generic Research for the benefit of all members
- Lower R&D costs for member companies
 - Shared facilities and personnel
 - Shared pre-competitive research
- Train next generation of technology leaders
 - Provide market ready experience
 - Connect industry with students



CHROMALLOY



Newport News Shipbuilding
A Division of Huntington Ingalls Industries



Rolls-Royce



SIEMENS

AEROJET



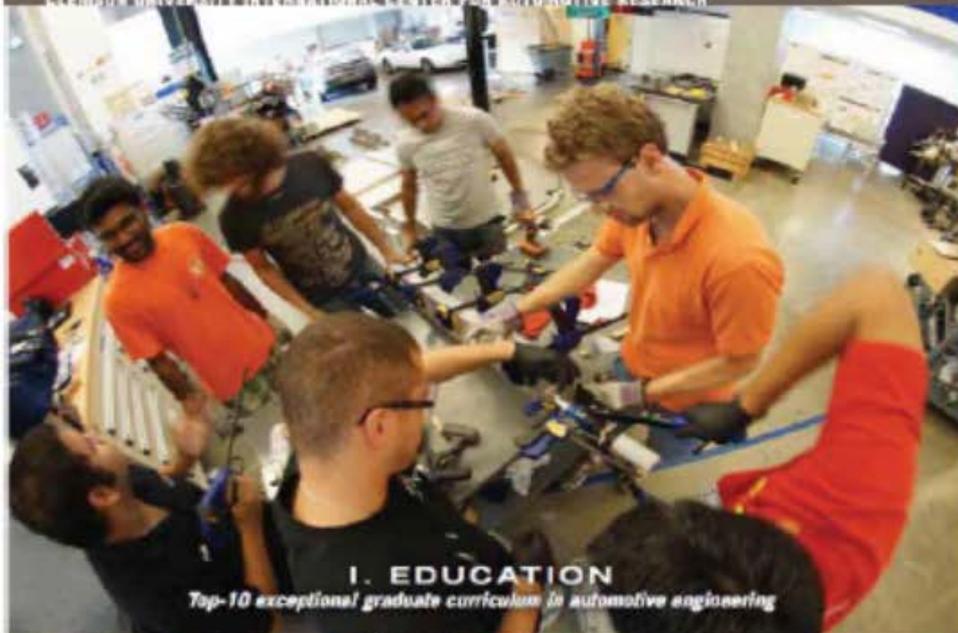
VirginiaTech
Invent the Future



International Center for Automotive Research, Clemson University

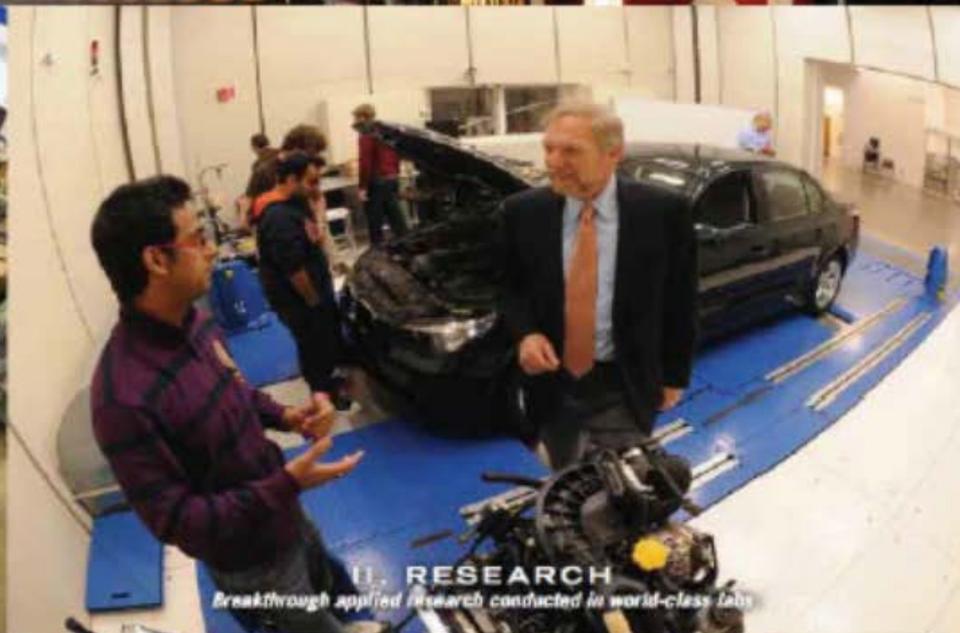
NOVEMBER 2010
Developing Engineering Talent for the Automotive Industry: A Case Study





I. EDUCATION

Top-10 exceptional graduate curriculum in automotive engineering



II. RESEARCH

Breakthrough applied research conducted in world-class labs



III. ECONOMIC DEVELOPMENT

Award-winning 250-acre technology research campus



IV. MAGNET VENUE

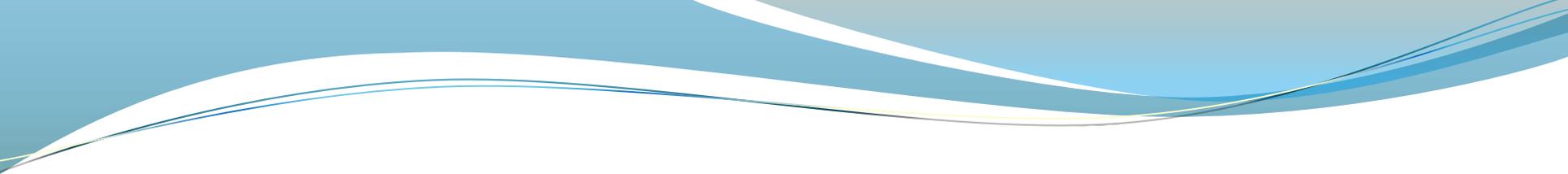
Hot spot for regional, national and global automotive and manufacturing events

Who Coordinates Key Elements of an Innovation Ecosystem?

Key Elements of Innovation Ecosystems



Source: Mary Walshok, 2010



Intermediaries to Bootstrap Innovation Ecosystems

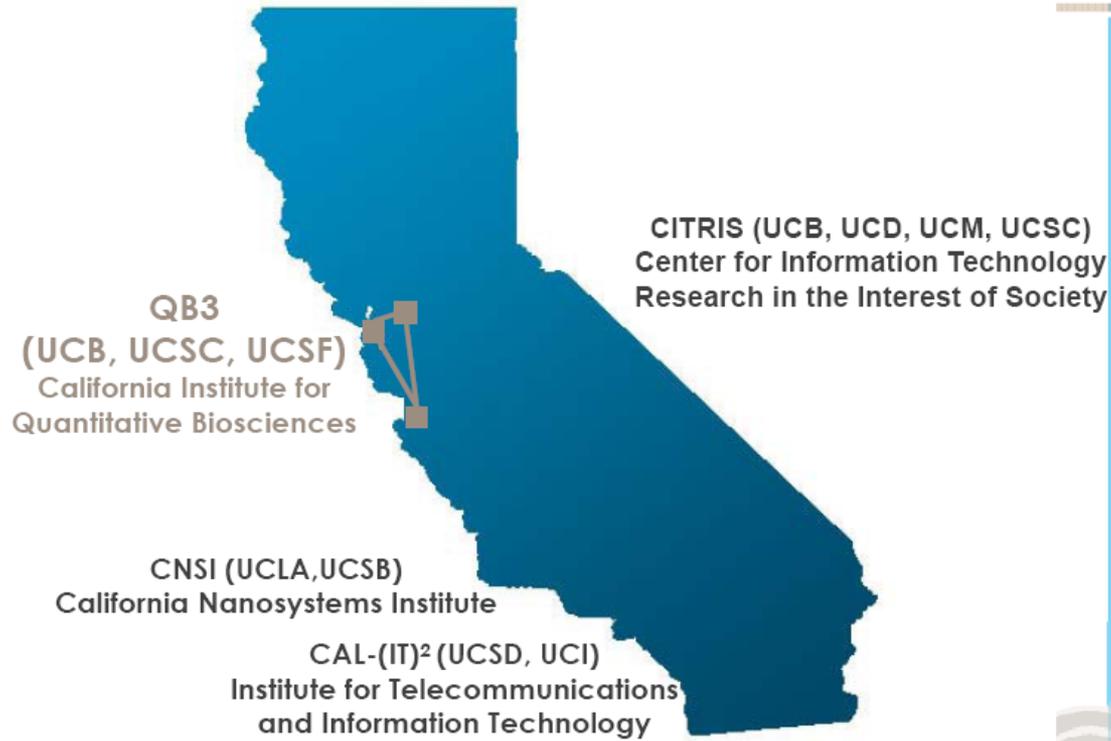
Oregon Nanoscience and Microtechnologies Institute

“ONAMI has emerged as a microcosm of a complete innovation strategy for a single technology area.”

–Shelia Martin, Portland State University

California's Institutes for Collaboration

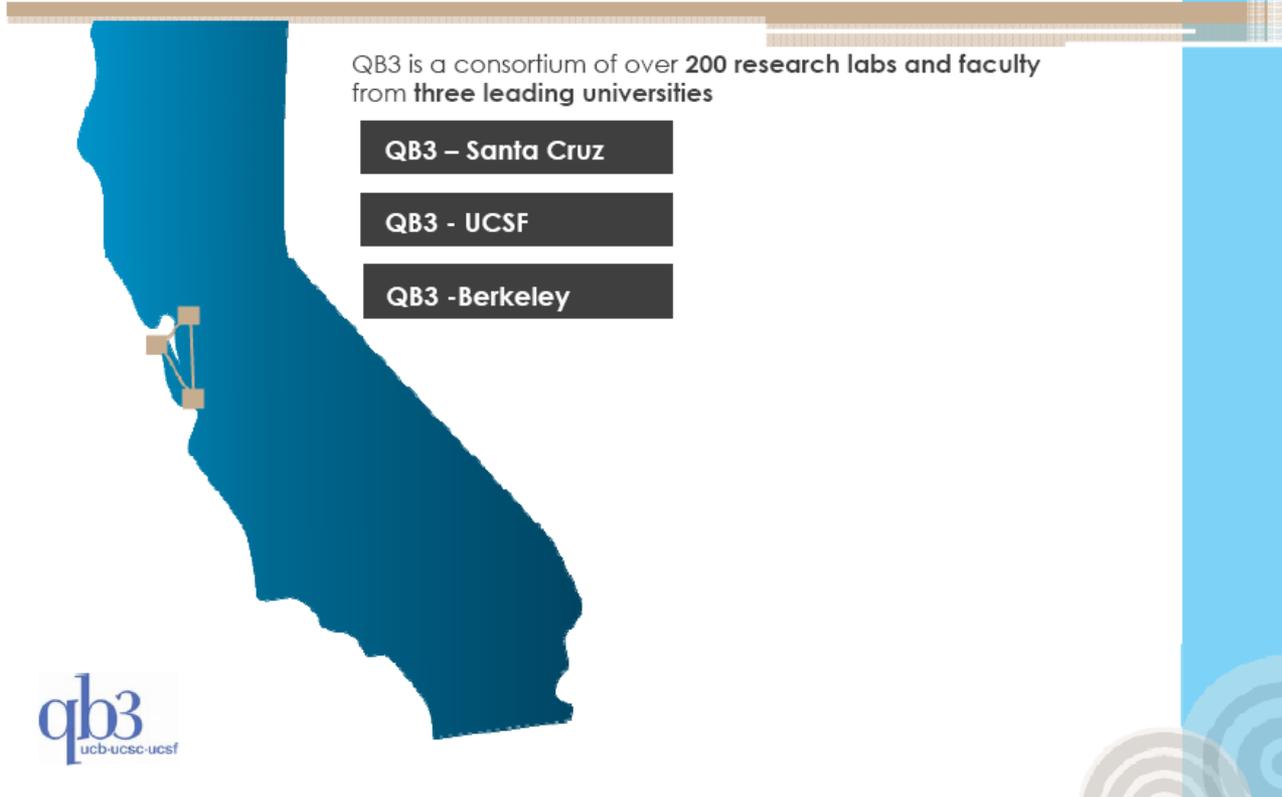
California Institutes for Science and Innovation



Source: Regis Kelly, QB3

Institute for Collaboration

Summary of QB3



Source: Regis Kelly, QB3

QB3 in San Francisco's Mission Bay

Creating an Innovation Cluster



And Revitalizing Abandoned Spaces and Communities

Source: Regis Kelly, QB3

QB3 in San Francisco's Mission Bay

The dream



QB3 in San Francisco's Mission Bay

What makes QB3 different

SCALE

QB3 is a multi-disciplinary and multi-institutional institute with more than 200 faculty

FACILITIES

Access to diverse, high-quality core research facilities

COLLABORATIONS

Affiliation with centers of Clinical, Engineering and Industry excellence

Proteomics & microarrays

Nano-fabrication

Informatics

Nikon imaging center

Small molecule discovery center

UCSF Medical Center

Engineering Sciences Berkeley

General Electric Life Sciences

FACILITIES

COLLABORATIONS

A vision of success through collaboration

Source: Regis Kelly, QB3

These Organizations Require

- **Leaders who proactively find and nurture connections across the boundaries** and know who to connect with whom. Companies and entrepreneurs need one point of contact that will connect them with all the diverse resources they need.
- **Speed and Flexibility in working with industry.** For this reason, non-profit organizations that operate outside of the university/government orbit may be needed, but they must excel at bringing together the resources of several universities.
- **Industry Focus that allows innovation to be strategically targeted** at sectors that are promising to the state or region. At the same time, however, there is a balancing act between being sector-focused (built up around innovation process and network for one sector) and bringing together research and companies from different disciplines and industries.
- **Space That Crosses Traditional Academic Boundaries** so that innovation results from different disciplines working together. Shared research facilities push researchers, entrepreneurs and industries beyond their specializations and allow for discoveries at the boundaries of disciplines.