



Arrowhead Center®
ACCELERATING ECONOMIC DEVELOPMENT

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Arrowhead Center

Office of the Vice President for Economic Development
New Mexico State University

Presented by
Kathryn Renner Hansen, Chief Operating Officer
Arrowhead Center

To
Enchantment INCOSE Chapter
April 11, 2012



Topics of Today's Presentation

- Arrowhead Center Overview
- Systems of Systems in Economic Development
- Regional Innovation Centers
- Unmanned Aircraft Systems

Arrowhead at a Glance

To develop strategic partnerships that create economic opportunity for the citizens of New Mexico and enhance the mission, purpose, and advancement of the university.

- Founded in 2004
- The Dean of the College of Business serves as the Vice President for Economic Development and as President of Arrowhead Center
- Environment where education, innovation, and economic development meet
- Economic Development: A process for creating economic opportunities for individuals and growth opportunities for enterprises, raising the standard of living for New Mexicans.



University Roles

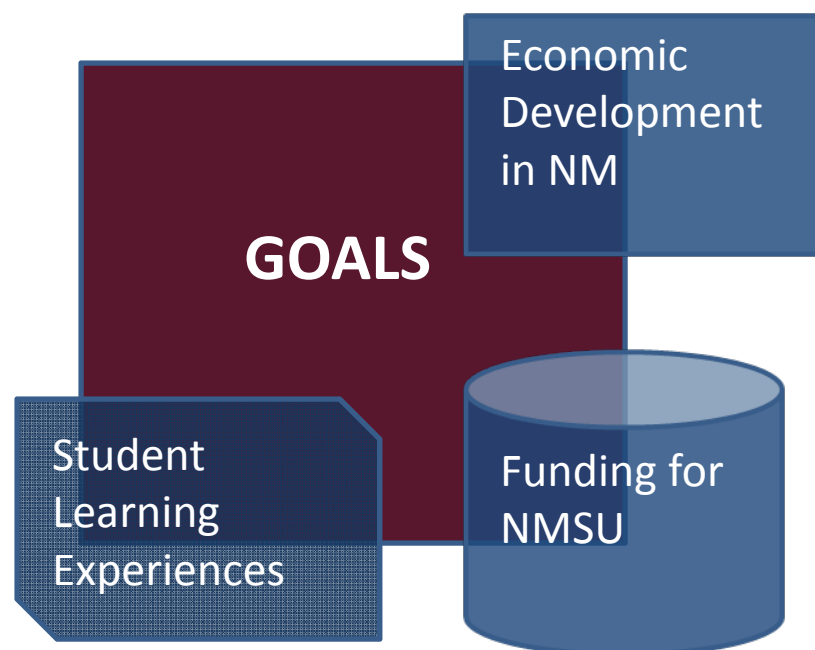
REGIONAL ECONOMIC DEVELOPMENT

- Provide jobs and workforce development
- Develop real estate
- Provide advice to start-ups
- Conduct research to support regional industries
- Create and convene alliances or coalitions
 - Discipline-specific research centers
 - Economic development organizations
 - Government entities
 - Industry groups

Goals: NMSU & Arrowhead

NMSU: Be the economic engine for New Mexico through linking and strengthening our research and economic development partnerships

Arrowhead Center



Organization



What and How

WHAT WE DO:

Create an innovation-driven economy.

HOW WE DO IT:

Conduct research to move ideas to market.

Launch start-up companies by serving and supporting the entrepreneur from idea to enterprise.

Support the growth of successful companies at the research park.

Provide students with directed learning experiences to expand their skill sets and prepare them to enter the innovation workforce.

Analyze the impact of public policies on the economy.



Who

WHO WE DO IT FOR:

Those throughout New Mexico who are eager to embrace new and emerging ideas.



Entrepreneurship Institute

WHAT WE DO:

Conduct research to move ideas to market and train entrepreneurs.

HOW WE DO IT:



Entrepreneur Ventures



Student Business Incubator



E- Laboratory



NME- Alliance



Innoventure

Entrepreneur Ventures

- Student led, client focused research and assistance for entrepreneurs, researchers, innovators, and government organizations
- Student innovation teams, multi-disciplinary, all colleges
- Over 300 studies since 2004 performed by 350+ students
- Business and marketing plans, feasibility studies, and market analyses



Entrepreneur Ventures Snapshot

3 of 8 current semester studies:

Space Sciences Corporation

- **Scope of work:** Craft a plan to help define markets for HALO (Hover Airlift and Logistics Operations) craft, an alternative transportation craft in development for homeland security, search/rescue, and recreation applications.

MVEDA

- **Scope of Work:** Characterize market segments that will be impacted by the Spaceport; identify economic development opportunities arising from operations at the facility.

Downtown Las Cruces Partnership

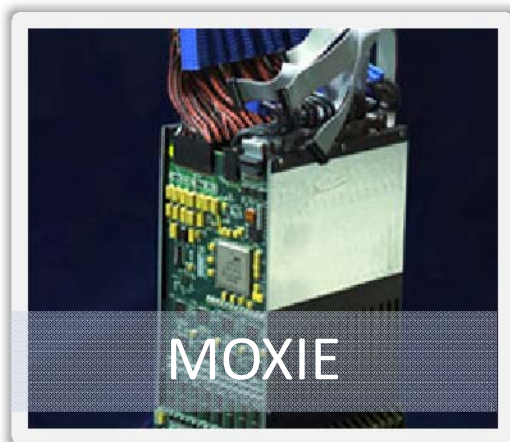
- **Scope of Work:** Develop a “destination study:” identifying the factor or factors that will serve to distinguish the Downtown area as a desirable space to visit or establish a business.

National Lab Collaboration

Student teams devoted to analyzing technologies, validating markets and investigating licensing opportunities.

Past and Present Projects

- MOXIE: Movies of eXtreme Imaging Experiments
 - Students forming a business and licensing technology
- RADIUS: Rapid Automated Decomposition of Images for Ubiquitous Sensing
- YXO, Inc.: Composite structure and frame solutions for the automotive and aerospace industries



NM Small Business Assistance

NMSBA allows New Mexico small businesses facing technical challenges to access the unique expertise and capabilities of Los Alamos, Sandia, and universities.

- No cost to the business
- Receive assistance from lab scientists or engineers for projects that require testing, design consultation, and access to special equipment or facilities

NMSBA growth @ Arrowhead:

- 2010: 3 projects
- 2011: 10 projects
- 2012: 19 projects expected to bring in over \$150,000
- The NMSBA program **leverages the expertise of NMSU resources**, partnering with more than a dozen faculty and staff from five colleges on campus.

Studio G

Studio
grow ideas



- 1st university-based student incubator in New Mexico
- A place where ideas grow
- Open to current NMSU students or recent alums
- 4 student companies in Studio G, one graduated company
- Most important? The ability to network and learn from others
- <http://studiognmsu.ning.com/>

Innovation Den



Innovation Den (iD) is a new living learning community that will launch in fall 2012.



iD is focused on entrepreneurship and innovation. Students living on campus will have the opportunity to live in this unique residential group and share their interests in entrepreneurship and innovation in a supported environment:

- Compete in Innovation Challenges
- Learn about the process of new venture creation
- Connect with Studio G
- Network with local entrepreneurs
- Learn new ways of thinking about and approaching problems in creative ways
- Explore opportunities for collaboration across majors
- Receive expert support from the NMSU Entrepreneurship Institute

Innoventure

Innoventure provides new generations of innovators with skills in technical design along with business savvy.

Annual statewide business and innovation competition for students grades 6-12

250(+) participants statewide, rural areas

Themes

- Products for Little People
- Kits for Extreme Situations
- Innoventureville
- Sustainable Agriculture



Arrowhead Technology Incubator

WHAT WE DO:

Accelerate technology-based entrepreneurial growth.



Energy



Space &
Aerospace



Homeland
Security



Information
Technology

Arrowhead Technology Incubator

HOW WE DO IT:

Provide access to a highly effective network of entrepreneurs, technology experts, investors, and consumers.

Offer a supportive entrepreneurial community and office space.

Provide business mentoring and demonstration-validation services.

Leverage relationships in the business ecosystem.



ATI Client Snapshot



SiliconMesa Corporation is a business service company that provides cloud-based software and secure data storage solutions.



Navitus Group has developed a pioneering Battery Management System (BMS) that has been shown to increase the life of lithium ion batteries by over 5x, with a goal of 10x in the next two years, significantly driving down the cost of high end battery solutions while reducing costs associated with maintaining and replacing them.



Solutionhead Technologies specializes in software development and business efficiency through technology integration. They provide custom software development, graphic design and brand identity.



Cinnafilm, a leader in GPU-based video format conversion, was founded to address the absence of quality, software-based tools to visually optimize, convert, and repurpose video images for cinema, broadcast, and web.

Arrowhead Park

WHAT WE DO:

Inspire an emerging hub for innovation and creativity that links scientists, technologists, and entrepreneurs contributing to New Mexico's economic development.



HOW WE DO IT:

Manage a 200+ acre public-private land development partnership on NMSU.

Develop mutually beneficial relationships between NMSU and industry.

Recruit private sector and government tenants

- Early College High School.

Drive developmental activities that contribute to the growth of the Park and entrepreneurial community:

- Expansion of Arrowhead Drive to 4 lanes
- \$27 million investment in last 4 years

Arrowhead Park Early College High School



New Mexico's first early college high school

- Unique public-private partnership
- Introduces entrepreneurial skills and encourages technology use
- Involves a cross-section of public and private partners
- Students graduate with high school diploma and college credits

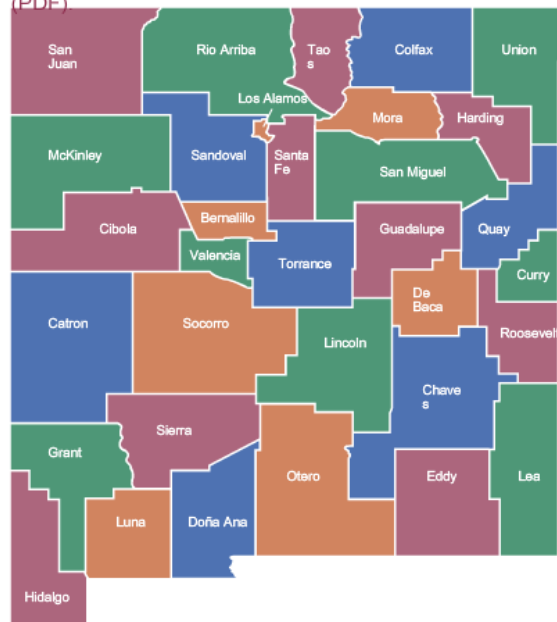
The ECHS movement began 10 years ago with funding from the Bill and Melinda Gates Foundation.

Policy Analysis

WHAT WE DO:

Analyze public policies and economic impacts.

Click a county to download its Economic Base Study (PDF)



HOW WE DO IT:

- Economic base studies
 - All New Mexico counties and SMSAs
- Economic impact studies
- Fiscal analyses and industry studies
 - Includes NM fossil fuel project for Department of Energy
- Economic policy analyses

Technology Commercialization

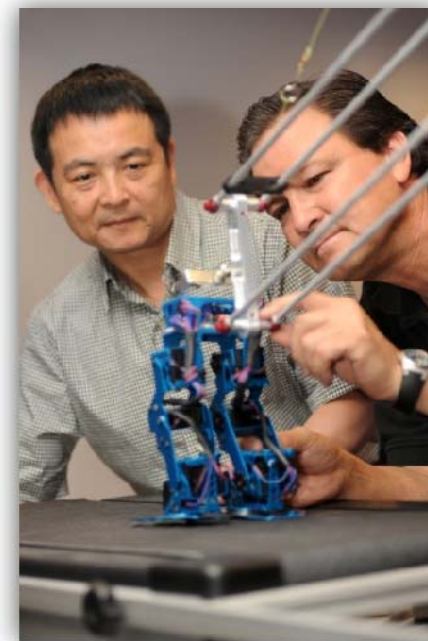
Pathways through which the innovations developed by NMSU researchers may have the greatest scholarly, economic, and social impacts.

Successful technology commercialization includes a range of activities, from IP management to technology licensing to start-up business formation.

■ Portfolio

- Registered copyrights = 8
- Patents awarded = 28
- Patents Pending = 12
- Provisional Patents = 3

Helping to administer Launch proof of concept program.



Proof of Concept Model

Objectives

- Provide early-stage funding
- Simultaneously develop prototypes and conduct market research
- Move innovation with near-term commercial potential into the marketplace
- Answer market needs
- Accelerate university technology transfer

Critical Elements

- Innovators
- Enterprise advisors
- Commercialization seed funding
- Graduate student entrepreneurship training
- Intellectual property management

Launch

WHAT WE DO:

Move innovative technologies from NMSU laboratories and development settings to market.

HOW WE DO IT:

- **Award up to \$25,000 cash** for technology development, market assessment, and business planning activities.
- **Provide researchers and technologists commercialization assistance.**
- **Provide mentoring and access to investment networks.**

WHO WE DO IT FOR:

NMSU faculty, staff, and students in all disciplines and fields of research.

Launch

FIRST ROUND OF FUNDING

- Seven applications from NMSU faculty, faculty-student teams, and a student-led team with a faculty advisor
- Arrowhead Center graduate students working with applicants throughout process
- Applicants from Biology, Chemical Engineering, Chemistry & Biochemistry, Economic Development, Electrical & Computer Engineering, Environmental Engineering, Information Systems, and Molecular Biology
- Finalists received feedback from investment community representatives before presenting to the Launch selection committee, forging possible partnerships
- Meetings with potential applicants led to exploration of other emerging technologies

Launch

FIRST AWARDEES

Drs. Jeffrey Arterburn, Charles Shuster, and Kevin Houston



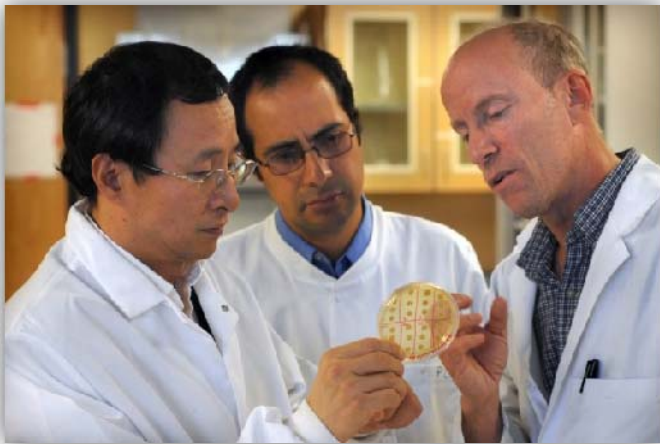
A new class of fluorescent organic dyes and associated compounds referred to as “HPY-Dyes.”

Applications in biological, biomedical, and biotechnology fields as indicators of cell viability and function.

Launch

FIRST AWARDEES

Drs. Geoffrey Smith and Shuguang Deng



Biohydrogenesis™ is a bacteria culture that produces large quantities of hydrogen gas and is able to capture that gas in a biopolymer.

Represents a potential U.S. domestic source of energy that may be very economical and does not use food sources (e.g., ethanol industry's use of corn)

Partnerships

NM Economic Development Department

New Mexico Small Business Development Centers

Mesilla Valley Economic Development Alliance

New Mexico Tech

Technology Ventures Corporation

All NMSU Colleges, Research and Extension

Partnerships

Los Alamos National Laboratory & Sandia National Laboratories

- NM Small Business Assistance Program
- NMSU DOE grant for technology business incubation
- Technology licenses
- Federal funding opportunities

White Sands Missile Range

Pursuit of business opportunities in national and homeland security, unmanned aircraft systems, energy and dual-use technologies

Integration, Interoperation

Attempts to design and implement approaches to solve complex problems through organization of multiple, diverse, independent components.

Models are:

- Problem-focused
- Multidisciplinary
- Collaborative
- Communicative

RETHINKING ECONOMIC DEVELOPMENT STRATEGIES

Traditionally

Economic development focused on macro (e.g., broad policies for “general” business environments) or micro (e.g., attention to individual companies or industries) issues, with government as funder/manager

Markets seen as largely homogeneous, viewed on a national scale

Economic development believed to “trickle down” from overarching, global players

Economic Development

RETHINKING ECONOMIC DEVELOPMENT STRATEGIES

Presently

Economic development focused on meso, or middle, where key actors (e.g., universities, local/regional organizations, researchers, and entrepreneurs) work and live

Markets seen as heterogeneous, specialized by regions

Government viewed as information source and facilitator of partnerships that spur economic development from bottom up



Regional Innovation Clusters

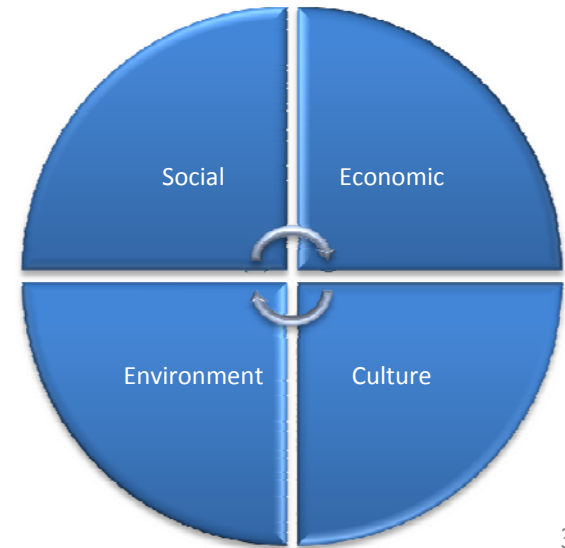
RICs

Per EDA, a “geographically bound, active network of similar, synergistic or complementary organizations...that leverage the region’s unique competitive strengths to create jobs and broaden prosperity”

RICs presumed to share social, environmental, economic, and cultural traits

Knowledge sharing and innovation “spillover” between players believed to fuel creativity, create and strengthen relationships

System of systems



Regional Innovation Clusters

SYSTEM OF SYSTEMS IN RICs FOR NEW MEXICO



State of New Mexico

NM may be posed as a “region” with many excellent economic development resources, but a general lack of coordination of these resources

NM has research, technology, entrepreneurial, and industrial assets

Geographical distance, lack of awareness of available assets, and perceived risks of partnerships have led to underutilization and under-partnering

A system of systems model could mitigate challenges, bringing together educational, industry, government, military, and nonprofit institutions to work on shared problems and opportunities

UAS RIC in New Mexico

Unmanned Aircraft Systems in NM

NM boasts assets in geography/climate, RDT&E, and established industry infrastructure that set the stage for UAS partnerships.



- Dependable flying conditions and diverse terrain
- RDT&E resources through universities, National Labs, and military installations
- Industry
- Only FAA-approved UAS Flight Test Center in U.S.
- Federal entities such as U.S. Border Patrol and USDA can provide input and serve as end-users

UAS RIC in New Mexico

Unmanned Aircraft Systems in NM: Challenges

A system of systems approach could mitigate challenges

- Leveraging all NM UAS assets
- Venture capitalist funding for UAS ventures
- Communication and cooperation among stakeholders
- Policies and incentives
- High-tech workforce



UAS TACC 2012 Conference

Speakers and attendees from many federal agencies (DoD, NASA, DHS, NOAA, BLM, USGS), aviation user groups (AOPA, AIA), universities, and private industry gathered to experience some of the industry's best networking and uniquely designed classified and open sessions.

When: December 4-6, 2012

Where: Tamaya Resort and Spa, north of Albuquerque, New Mexico

Website: taac.psl.nmsu.edu

Sponsored by: New Mexico State University:
Physical Science Laboratory



TACC 2012
December 4 - 6

For More Information

SEEKING PARTNERS IN ECONOMIC DEVELOPMENT



Contact Arrowhead Center

Visit our website at arrowheadcenter.org

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