“Act Locally, Think Globally” 
Networking (Connectivity)

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AGENDA

- About New Mexico and UNM
- Challenges
- International Collaboration
- Peace Engineering
- Innovation Plaza
- Why GINET?
- Summary-Conclusions
Quiz ... what place is ...

Richard Feynman  Ed Roberts  Gates & Allen  Cleve Moler

... the birthplace of modern energy physics?
... the birthplace of the microcomputer?
... the birthplace of modern software?
... the birthplace of mathematical software?
... the home to the largest group of aliens on Earth?
About New Mexico and UNM
New Mexico History and Culture

- First European establishment in North America (1596)
- Achieved statehood in 1912
- 5th largest state in the US
- Diverse population
  - Highest proportion of speakers of Spanish, Navajo and Zuni
  - 22 pueblos, tribes and sovereign nations
New Mexico Unique Statistics

- 5th highest concentration of tech workers in the nation
- Los Alamos has more millionaires than any other US city
- 4 military installations and Spaceport America
New Mexico Technology Traditions

- **Innovation Leaders**
  - Since the Manhattan project, NM has been a center of high tech
  - Birthplace of Microsoft, Matlab, ISTEC, Khoros, et al
  - Home to Sandia National Laboratories, Los Alamos National Laboratory, and Kirtland Air Force Base

- **Prime tech strengths focus on**
  - Aerospace and Aviation
  - Bio-Technologies and Healthcare
  - Energy, Environment and Water
  - Information Technology and Software
  - Nano-Technologies and Microelectronics
NSF Engineering Research Centers

Second nationally in the number of ERC participations

- Nanomanufacturing Systems for Mobile Computing and Mobile Energy Technologies (NASCENT)
- Quantum Energy and Sustainable Solar Technologies (QESST) ERC
- Biorenewable Chemicals ERC
- Smart Lighting ERC
Challenges
Challenges

http://www.engineeringchallenges.org/
Challenges

15 Global Challenges facing humanity

1. Sustainable development and climate change
2. Clean water
3. Population and resources
4. Democratization
5. Long-term perspectives
6. Global convergence of IT
7. Rich - poor gap
8. Health issues
9. Capacity to decide
10. Peace and conflict
11. Status of women
12. Transnational organized crime
13. Energy
14. Science and technology
15. Global ethics

by The Millennium Project
www.millennium-project.org
Challenges

• Fund Raising
  • State funded, located, tolerated
• Develop a joint Socio-Economic Plan with stakeholders from NM with international component
  • Academia, cities, state agencies, national labs, NGOS, entrepreneurs, community leaders
  • “Sister City” efforts
  • Connect UNM/STC/SNL and Innovate ABQ to International Tech-Park Networks
Challenges

• A coherent Internationalization Plan that involves UNM North and South campuses
  • Collaboration between both campuses: HSC, SOE, Business, others

• National and international mobility plan and funding for our students
  • Internship programs
  • Study abroad programs

• Influence policy at local, regional, national and international levels
  • City, State, Federal, Global
Challenges

• **International** Economic Development/Entrepreneurship activities
  • STC: HSC, SOE, Anderson, others but with *internationalization* component
  • Partner with *international* strategic academic institutions

• Need to break away from traditional learning/teaching silos
  • **International** Senior Design projects
  • Student Success: graduation rates, retention
  • Plant the seed of *international innovation, creativity and entrepreneurship* in the curricula
Bridging Academic Research, Government and Industry Research

University

Small Business

Industry

Investors

VCs/Angels

Valley of Death

Foundations

Translational Research

I/UCRC
• SBRI/STTR
• PFI/AIR

Innovation & Entrepreneurship

Discovery

Development

Commercialization

Level of Development

Resources Invested
Challenges

• Development of **multilingual/multicultural** on-line and in-class content (Spanish, Portuguese)
  • Multicultural 2 + 2 Program: first 2 years in home country and last 2 years at UNM
• MOOCS – **multicultural/multilingual** on-line education/learning
  • Remote labs - MOOCHOS
  • Degrees and certificate programs
Challenges

• Establish **remote campuses** with strategic academic institutions
  • 4+1 undergraduate/graduate degree in a market where the undergraduate degree is 5 years

• **International Partner Universities Faculty Development** (on-site and on-line)
  • CELAC – English Training
  • SOE and ASM MS/PhD programs

• **Culture of Quality** (GRANA)
  • Accreditation of Programs
Challenges

• Participate in international Meta universities efforts
• Participation in international forums
  • IFEES, GEDC, ASEE, ISTEC, SPEED, other
• Strategic international partnerships/relationships with industry-university-government-society
• International members in SOE and Department advisory boards
International Collaborations
Collaboration

\[ \propto \frac{1}{d^n} \times T \]

\( T \) = Tropicalization, \( d \) = Distance, \( n \) = Bureaucracy
Collaborations

EDUCATION

• Joint curricula development and certificate programs
  • English, Spanish, Portuguese
• Undergraduate and graduate student exchanges
• Experiential and transdisciplinary learning
• Internships
• Create/Enhance Graduate Double Degree Programs (MS and PhD)
• Create/Enhance Undergraduate/Graduate Double Degree Programs (BS/MS)
  • Global Engineering Scholars Program (4+1 Programs)
  • Multicultural 2 + 2 Program: first 2 years in home country and last 2 years at UNM
Collaborations

CREATIVITY AND INNOVATION

• Joint R&D basic and applied
• Entrepreneurship/leadership (social, business) building and economic development
  • Create/enhance/participate in technology park networks
• Incubation and acceleration of spinoffs
• Access to capital
• Business Development – Marketing, finances, administration
• Protection, licensing of Intellectual Property
• Internships local and international: Industry, R&D centers, Technology Parks, other
Collaborations

POLICY AND FUNDING

• Private Equity: Venture Capital, Investment Banking, Crowd-funding
• Presence in international forums
• Influence in policy making
• Create/enhance university-government-industry-society partnerships
Peace Engineering
Peace Engineering

A trans-disciplinary program emphasizing innovation and creativity, while stressing the importance of applying science and engineering to solve practical problems that advance social, economic, and environmental solutions globally.
NEW INTERNATIONAL LEADERSHIP IS NEEDED!!!!

• Social entrepreneurs
• Business entrepreneurs
• Leadership building
• Mobility
• Teamwork, Collaboration
  Inter/multi/transdisciplinary
• Tolerance
• Ethics
• Diversity
Innovation Plaza
Innovation Plaza

• To meet the challenges, curricula must be innovated, enhanced and strengthened.

• Addressing this need, UNM and industry developed the Innovation-Plaza, a program that integrates enhanced curricula and educational outreach with an open, globally connected, interdisciplinary lab for entrepreneurship, experiential learning and collaboration.
Innovation Plaza!

- Experiential
- International
- Entrepreneurial
- Innovative content
- Industry partners
- K12 outreach
- On-line
- ABET

Improve recruitment + retention
One premise of the Innovation-Plaza is that the students have their noses in the textbook too much. They are missing out on the excitement and richness of experiential learning. They are not getting to tinker, explore and fiddle with stuff. We want to tap their creativity and foster entrepreneurship early!!!!!!
Traditional Silos of Engineering Education

High School

Trade School

University

Research

Profession

Thinking Science & Engineering

Supporting Science & Engineering

Learning Science & Engineering

Expanding Science & Engineering

Doing Science & Engineering

Silos are bad! We want interdisciplinary!
The Innovation Plaza is a common lab shared by all disciplines, all levels of education, all courses.

- Multidisciplinary
- Applications
- Synthesis
- Entrepreneurship

ECE
- Computing
- Control, robotics
- Signal + systems
- Circuits
- Digital design
- Electromagnetism

Others
- Structures
- Process control
- Math, stats
- Nano-tech
- Capstone/Entrepreneurship
- Off-campus

From middle, high school to grad courses across geographical and diversity borders!
Creativity in Engineering

• Coffee Can Radar
  – Low and high level programming (C, Java, LabView, VHDL); Circuits; Digital Systems; Signal and Systems, EM Theory; Antennas; Telecommunications

Colombian or Brazilian?????
A local project turned into a global product!

Students, staff and faculty involvement!!!!!
Senior Design
Entrepreneurship and Leadership

• Present undergraduate students with challenges that foster entrepreneurship and transnational collaboration while encompassing the values espoused by Peace Engineering.

• Students take an idea, which must be sustainable and exhibit social, cultural, and environmental responsibility, full circle from the laboratory to commercialization.

• These efforts embrace Peace Engineering and foster a new generation of conscientious, effective global leaders.
Senior Design – Entrepreneurship and Leadership

• Apps development for people with learning disabilities (e.g. Autism)

• Awarded Second Place in High-Tech Business Plan Contest, UNM Anderson School of Management, Sponsored by Sandia National Laboratories

• Foster creativity and innovation
Why GINET?
Vision

• The vision of GINET is to create a Global Innovation Network of Entrepreneurial Programs among Academia, Industry, Research & Development Centers, Governments, Investors/Mentors, Multilateral Organizations, and Individuals/Visionaries/Entrepreneurs (serial and first time).
Objectives

• Building Capacity and Tech Transfer through identification of innovative ideas and through strategic alliances with investors, industry and government agencies, which will bring these innovations to the marketplace.

• Foster global interaction among academic institutions to accelerate R&D from the laboratory to the marketplace.

• Educate for, promote, and encourage the generation of new products and services that can drive innovation and entrepreneurship.

• Promote global entrepreneurship through GINET events such as capacity building, business round tables, university-industry relations, investment activities, etc.

• Facilitate international venture funding through GINET to sponsor brilliant minds and projects.
Contributing Areas

Gateway for Innovation, Entrepreneurship, Education, S&T, R&D

- EDUCATION
- IP, R&D
- SOCIAL RESPONSABILITY
- SERVICES
- CAPITAL
- MARKETS
- POLICIES
Excellence in Education & Research, Innovation and World-class Entrepreneurship – a Continuum and Team Approach
Summary-Conclusions
Summary-Conclusions

In summary the SOE plan, aligned with UNM, is to foster international economic-social development through education, innovation/creativity, policy, funding, and entrepreneurship (social and business). We want to be pro-active in establishing collaborative models that can be replicated globally.

It’s the human connectivity!!!!
Looking for partners!!!

Go Green

Thank You
Gracias
Obrigado
Merci

www.ece.unm.edu