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# UA3/9/5 Partnerships for Progress: Linking Higher Education & Economic Development

WKU President's Office

Gary A. Ransdell

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**PARTNERSHIPS FOR PROGRESS  
LINKING HIGHER EDUCATION AND ECONOMIC DEVELOPMENT  
NATIONAL GOVERNOR'S ASSOCIATION CENTER FOR BEST PRACTICES**

**THE CHAMBERLY BROWN HOTEL  
LOUISVILLE, KENTUCKY  
DECEMBER 3, 2001**

**GARY A. RANSELL  
PRESIDENT  
WESTERN KENTUCKY UNIVERSITY**

In response to Governor Patton's challenges to create Programs of Distinction and enhance the state's capacity for economic development, we, at Western, have created a series of applied science centers. These centers are directing faculty talent toward creating a relevant curriculum in the sciences, toward solving environmental and material problems which limit economic development, and toward creating practice-based experiences for students. A by-product of these centers is a strengthened core curriculum which brings the applied sciences into focus for all WKU students. This brochure outlines the Applied Research and Technology Program, which is our principal Program of Distinction in Governor Patton's higher education reform program.

How has the Applied Research and Technology Program supported economic development?

The Applied Research and Technology Program (ARTP) is having a profound impact on the economic development and quality of life of the region. The ARTP is an interdisciplinary program that facilitates the collaboration of faculty and student mentors to conduct applied research to meet the technical needs of constituents. Outreach efforts to aid constituents with technical assistance to solve their real-world problems while involving students has helped build a rapport between Western Kentucky University and these constituents. This rapport has led to connections with additional constituents and, thus, the net has expanded. This network has positioned Western Kentucky University to take full advantage of HB 572, the "New Economy Initiatives," which requires universities to serve as a catalyst for economic development through partnerships with existing industries and innovations that led to the origination of high-tech companies. The commitment by the Commonwealth and the climate for technical assistance through the ARTP have encouraged companies supported by local venture capitalists and entrepreneurs with nascent high-tech companies to approach the ARTP for assistance and as a portal for seeking new economy incentive funds. As evidence, five proposals for funds from the Kentucky Science and Engineering Foundation have been submitted. These involve partnerships with such companies and ARTP faculty.

The ARTP has the potential to create innovations that can lead to new high-tech companies. The ARTP is about to spin-off its first high-tech company via our Applied Physics Institute in collaboration with our Materials Characterization Center and the Engineering

Services Center. The ARTP is assisting existing companies in becoming more technically driven and more focused on the Materials Characterization Center's aid to power companies. The Biotechnology Center has the potential to spin off another high-tech company and has a patent application that might lead to yet another company.

The ARTP's attention is on four of the focus areas for economic development as identified by the state's New Economy Initiative, and the statewide Science and Engineering Strategy. These areas are environmental, biotechnology, and materials science and manufacturing and engineering. The ARTP's strengths in nanotechnology, biotechnology, and environmental science complement those of the research I universities, the University of Louisville, and the University of Kentucky, as well as other comprehensive universities. Coordinated efforts among these universities are necessary to build the critical mass in focused areas of emerging technologies given the limited financial resources of the state in order to make significant progress in economic development in the high-tech sector. The fact that the ARTP has strengths complementary with the two research I universities will facilitate such coordinated efforts and collaborations. Furthermore, the ARTP will be able to support spin-off companies from the research universities, as well as companies being developed in nearby Nashville. The ARTP can offer to spin off companies throughout the region via the newly-developed Innovation and Commercialization Center in Bowling Green. The ARTP stands ready to support economic development through direct assistance to existing and developing companies and governmental agencies involving students mentored by faculty. It is hoped that through these efforts a workforce with relevant knowledge and skills will be developed. In addition, it is hoped that our best students will continue their education at one of the state's research I institutions, thereby stemming the brain drain and developing the intellectual capital within the Commonwealth required to fuel a high-tech economy.

I want to briefly describe two centers in our ARTP which illustrate the efforts of our faculty to solve real problems, strengthen our state's economic development capacity, and help grow a new economy.

#### EXAMPLE ONE

##### THE APPLIED PHYSICS INSTITUTE

The Applied Physics Institute is an Institute devoted to the development of non-intrusive, non-destructive nuclear and atomic techniques for inspection of various objects and commodities. It is funded by several Federal agencies including the Department of Defense, Office of National Drug Control Policy, and the National Science Foundation. Its annual budget exceeds \$700,000, and it employs nine full-time scientists. The work at the Institute has resulted in one patent and two pending patents. Research performed at the Institute has resulted in accomplishments such as:

- Development of Pulsed Elemental Analysis with Neutrons (PELAN) – a pulsed neutron-based instrument designed for the detection of explosives (such as those used in terrorist acts), interrogation of unexploded shells, detection of chemical weapons, and for humanitarian demining. PELAN has been licensed by SAIC, a major 40,000 employee

company, and will soon be used by bomb squads in the U.S. and by the United Nations for humanitarian demining worldwide. (Hold up PELAN instrument.)

- Development of the On-Line Coal Analyzer—a nuclear device housed in a 14ft x 8ft x 8ft container that provides on a minute-by-minute basis information on important coal parameters such as BTU content, moisture, sulfur, ash, etc. The first of these analyzers has been purchased by TVA and will be installed in a few months at the Cumberland coal-fired power plant—the largest and newest TVA coal-fired power plant.
- Development of NELIS—another nuclear based device for the inspection for hidden drugs of commodities entering the U.S. on pallets. This is a device that can inspect a pallet without touching it and, in four minutes, verify, for example, that a shipment of pinto beans does not contain any drugs hidden in the middle of the pallet. This device is funded for the U.S. Customs Service by the Office of National Drug Control Policy and is currently going through its final evaluation.

## EXAMPLE TWO

### THE MATERIALS CHARACTERIZATION CENTER INITIATIVES

The Materials Characterization Center (MCC) has developed into a major focal point for carrying out the mission of Western Kentucky University. By combining the elements of basic and applied research with public service activities, such as providing analytical services and solutions to problems for regional and national industries, and focusing on the education of students, the MCC provides the best possible learning opportunities for its students.

The MCC thrives because of the incorporation of teaching, research, and public service activities into almost all of its projects. The circulated diagram (Objectives) illustrates the contributions in each of these areas in recent years. The total number of clients from the U.S. and Canada has increased to over 200 during the last five years. Ideas generated through collaboration with clients and professionals at other institutions, along with aggressive proposal writing, have generated new projects. All these activities have attracted more students to work in the MCC. The education of the students remains as the focal point for the activities.

The Statewide Strategic Plan for Economic Development in high-tech, high-paying industries has five focus areas, which are:

- Materials science and manufacturing
- Environmental and energy technologies
- Biotechnology and bioengineering
- Information technologies and communication, and
- Human health and development

Major educational, research, and service initiatives in the Materials Characterization Center address the first two of the focus areas and indirectly address the third.

The MCC currently has four funded (US DoD) nanotechnology research projects, focusing primarily on the synthesis and characterization of nanocomposites from organically modified clays. These materials can be modified to serve as filler materials for different types of polymers and thus change the nature of the polymeric materials to make them more heat resistant and less permeable to gases (soft drink bottles), or more rigid and less flexible (for use as cryotanks for liquids in rockets). Two of the funded projects provide fellowships for grad students, including a student worker on her Ph.D. at the University of Louisville. Proposed activities are to expand the current research in nanocomposites to include processing capabilities, and to expand our nanotechnology research to include synthesis of materials for environmental and biotechnology applications.

The MCC has been involved in energy-related research for over 20 years and has built an international reputation in this area. Several currently funded projects (Electric Power Research Institute, the Illinois Clean Coal Institute, and TVA) in the MCC address the environmental aspects of energy production and include research on reducing the emission of mercury from power plants and to assess the effect of coal chlorine on the corrosion of boiler components. The mercury and chlorine projects are being conducted at East Kentucky Power Cooperative's John Sherman Cooper Plan near Somerset, Kentucky. Another current project is the constructing of a model for predicting the time needed for impounded fly ash to reach a state where it is environmentally safe and does not need to be capped with a clay layer.

Another energy-related initiative in the MCC is the development of a demonstration laboratory for circulating fluidized bed combustion (CFBC) studies. Planned activities for this facility are expanded studies of co-firing high sulfur coals with municipal solid wastes. This particular research is also environmentally attractive since it is focused on the firing of high sulfur coal from western Kentucky with municipal solid wastes, which are normally sent to landfills, in a CFBC system which produces minimal emissions. We are pursuing funding for the construction of the CFBC facility with the help of our legislators in Washington.

Finally, I want to describe two additional examples of centers outside the ARTP which are serving our new economy initiatives equally well.

### EXAMPLE THREE

#### THE SCOTT CENTER AT WESTERN KENTUCKY UNIVERSITY

The Scott Center at Western Kentucky University was created with a generous gift from James D. Scott, founder of Scotty's Contracting. The vision behind the Scott Center was to create a partnership between academia and industry. The Scott Center combines the resources of Scotty's Technology Center (STC), which is a materials testing lab, and the Engineering Department at Western Kentucky University. The resulting "Scott Center at WKU" is used to create a flow of technical knowledge, professional training, consultancies, and technical support from the University to the engineering and construction community. In addition, the Scott Center greatly enhances the educational experience of civil engineering students by directly involving them in practical situations.

Since its inception in 2000, the Scott Center has provided technical expertise on 17 engineering projects in this region. The value of these projects is twofold:

1. The expertise of the combined resources of The Scott Center creates the equivalent of a Geotechnical and Materials Engineering firm which currently does not exist in this area. When businesses choose to relocate here or build new facilities, they must have local engineering expertise to develop appropriate designs for these structures. With the unique Karst geology, these engineering challenges are such that it's critical to have local engineers with experience in that area. Now that the capabilities of The Scott Center are more well known, architects and business owners are contacting us to help in the design of new structures. This creates a very "user friendly" engineering environment for businesses that need construction to expand their capabilities in this area.
2. The Scott Center makes full use of civil engineering students on these projects. The students work side-by-side with professional engineers who are also their professors. The impact is immeasurable. The students can work on real projects with their professors, and these tasks actually result in the mobilization of equipment, expenditure of real money, and erection of a structure. Students are forced to think critically about every step of both simple and complex tasks, and they learn to understand not only the process of what they are doing but the impact of what they did on a much larger scale. They become engineers.

The Scott Center has certainly succeeded in bringing together academia and industry in such a way that the students benefit, the university benefits, and economic growth and expansion of the region are enhanced. This concept has been delivered through professional presentations at both educational conferences as well as engineering conferences and has been seen as a model for this type of partnering.

#### EXAMPLE FOUR

##### THE CENTER FOR INFORMATION TECHNOLOGY ENTERPRISE

The Center for Information Technology Enterprise, in collaboration with the Gordon Ford College of Business at Western Kentucky University, is a non-profit organization providing information technology leadership, expertise, and strategy and policy planning to business, government, and educational institutions in the Commonwealth.

#### Goals

The Center was conceived and created by the Computer Information Systems faculty in response to an economic development need. This need was then verified by the business community, the Chamber of Commerce, the University, and State government. Funded as a public-private partnership, the Center for Information Technology Enterprise provides customized independent information technology services through the expertise of faculty and MBA students as well as undergraduate students in Computer Information Systems.

## Projects

Currently, CITE is conducting a three-year project for the Kentucky Innovation Commission, called "Connect Kentucky," that will assess the Commonwealth's preparedness for living in the networked world. This assessment is funded through the combined efforts of federal, state, and private sector dollars. The major thrust of CITE and the "Connect Kentucky" initiatives is to "provide technical infrastructure and communication facilities to assist in attracting 'new economy' companies to the region and to the State."

In closing, I must also add that Western has a second Program of Distinction called the Center for Twenty-First Century Media that has as its cornerstone, the nation's premier School of Journalism and Broadcasting.

In 1997, Governor Patton challenged the universities in Kentucky to create at least one program that would rise to national prominence. To date, WKU is the only university in Kentucky to earn a number one national ranking for one of its academic programs. For the last two years, the WKU School of Journalism and Broadcasting has been recognized by the William Randolph Hearst Foundation as the number one Journalism program in America. This ranking is based on year-long assessments of faculty and student work, several national competitions, and success of graduates.

Other Journalism schools ranking behind Western include those at Northwestern, Missouri, Syracuse, Kansas, Indiana, Southern California, Penn State, and Florida.

We are proud of our best practices at Western Kentucky University. Thank you.