

TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)

**EDUCATION AND INFRASTRUCTURE
PROGRAM**



Arizona's First University.

September 1, 2009

Critical to the economic viability of Arizona are highly trained workers, accessible quality healthcare, state-of-the-art information systems, and knowledge-based industries. In November of 2000, the Technology and Research Initiative Fund (TRIF) was created through Proposition 301 to support programs aimed at these and other educational needs.

Five initiatives comprise TRIF-funded Infrastructure programs. Individually, they have created new educational programs, expanded access to educational content, and built an infrastructure to move local research efforts to the market place. Combined, they are changing how knowledge is conceived and consumed – on and off campus – and are building bridges to educational, corporate, and health care entities throughout the state and beyond.

Workforce Initiative: The Educator Development Plan (EDP) addresses the shortage of highly trained math, science and agriculture science teachers by designing new curricula and supporting program graduates to remain in the state. Direct outcomes are an increase in teaching resources and a direct impact on K-12 students in classrooms with newly certified teachers.

In healthcare, service delivery systems have not kept pace with the explosion of information and technology. College of **Nursing Online Graduate Degree and Certification Programs (NOP)** expands access to high quality nursing education by delivering course content with distance learning, internet-related technology. The online Nursing Ph.D. program is the first of its kind. New degrees and certificates are being developed to meet the needs not only of students, but of residents throughout the state – particularly in rural areas.

Anyplace Access for Arizonans (AAA) responds to workforce and workplace needs by exploiting information and communication technologies to offer the best of public higher education and outreach activities to all Arizonans, regardless of place. Participants seek knowledge and information for use in work and life settings – knowledge that can increase lifelong earnings, improve productivity on the job, and solve practical problems in their daily lives.

Critical Core Infrastructure (CCI) centralizes support for selected high technology research fields that depend on laboratory facilities, advanced computing resources and high bandwidth connectivity. While TRIF investments in infrastructure were made throughout the first five years, these investments were made one initiative at a time. Investments in research buildings, assuring appropriate laboratory space, occur as debt service. Investments in computing and communications infrastructure occur within the central computing organization, UITS. The goal is to enable research, and by enabling research, to

Contents

Introduction	1
Performance Measures	2
Performance Analysis	2
Goals	3
Financial Information	3
Management	4
Advisory Boards	4
Learn More	4



Ronald Marx, Ph.D.
Dean, College of Education

PERFORMANCE MEASURES

	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Proj	FY07 Actual	FY08 Proj	FY08 Actual	FY09 Proj	FY09 Actual	FY10 Proj	FY11 Proj
RETURN ON INVESTMENT (\$ IN MILLIONS)													
Sponsored Awards	\$ 0.033	0.973	1.249	3.785	4.820	1.910	4.027	2.020	2.525	2.712	4.132	2.559	2.662
Gifts & Other Sources	\$ 0.069	0.277	0.357	0.485	0.781	0.883	0.753	0.943	1.068	0.841	1.150	0.923	1.016
Patent Royalty Income	0.714	1.08	1.010	1.176	1.689	1.520	1.223	1.670	0.690	1.820	.687	1.970	2.110
TECHNOLOGY TRANSFER & COLLABORATIONS													
Invention Disclosures	109	111	95	102	88	135	104	114	99	114	124	135	145
Licenses & Options	18	24	25	32	36	38	30	36	39	36	43	40	45
Patent Applications	6.2	7.7	9.1	10.6	10.9	10.5	12.1	11.5	14.3	11.5	12.5	12.0	12.5
New Start-up Companies	10	1	7	9	6	14	3	5	5	5	7	6	7
Economic Impact Studies	0	0	1	1	0	1	2	1	0	1	0	1	1
WORKFORCE CONTRIBUTIONS													
Number of Graduate Students Enrolled			19	37	161	316	191	358	241	294	253	307	320
Number of Graduate Degrees Awarded						58	29	40	56	44	56	51	57
Teachers Certified in Undergraduate Level Math & Science			7	12	24	40	24	40	25	30	27	30	30
Teachers Certified in Master's Level Math & Science			28	25	40	30	24	30	14	25	14	25	25
Teachers Certified in Agriculture			8	13	16	12	11	17	13	19	17	20	20
Certificates granted for AAA + Nursing					9	50	0	58	85	84	12	105	128
CURRICULUM INNOVATIONS & STUDENTS SERVED													
Number of Newly Revised Courses Offered *				8	10	14	48	8	14	10	36	11	16
Number of Online Courses Offered	0	10	19	28	28	37	16	9	19	8	61	4	3
OUTREACH & EDUCATION													
K-12 Students Benefiting & Participating	2,150	2,500	3,200	3,800	3,000	4,250	2,950	8,600	2,600	13,300	2,600	18,050	22,000
Workshops, Seminars, & Conferences Supported	0	0	1	1	2	2	4	0	0	0	0	0	0
Users of Extension & Workplace Resources**	0	493	58,000	103,000	156,055	200,000	31,415	250,000	225,503*	300,000	5,470,117	350,000	400,000
Enrollments in Web & Hybrid Courses	0	20,450	24,528	35,353	77,557	39,373	104,715	41,085	2,154	2,404	4,624	2,654	2,904
DATA AND RESEARCH ACCESS & NETWORK													
Building Networks Brought to Standards						1	1	1	1	1	1	1	1
Supercomputer Usage						85-90%	90%	85-90%	78%	85-90%	94%	85-90%	85-90%
Percentile-Ranked Access to Advanced Networks						75th or better	75th	75th or better	50th	75th or better	50th	75th or better	75th or better

*Includes courses being developed for Fall 09 and Spring 10 implementation.

**Due to data limitations, "hits" are being reflected in this number for some program categories.

contribute to regional economic development.



Technology Transfer Infrastructure Plan (TTIP)

supports the UA as a driver of an Arizona knowledge-base economy by moving research to the market place, creating new knowledge-based industries, and bringing UA innovations into broad and public commercial uses. The initiative supports the collaborative environment for research within the UA exemplified by the TRIF Research Programs. Working together with those programs, the plan integrates their translational efforts with economic development and market activities driven by UA's Office of Economic Development (OED) and Office of Technology Transfer (OTT).

PERFORMANCE ANALYSIS

The *EDP* initiative was successful in producing over 350 certified teachers in math, science and agriculture science during the first five years. These teachers have been employed in schools throughout Arizona and have had a direct impact on K-12 students. We conservatively estimate each teacher will impact 50 students annually. An infrastructure is now in place to efficiently train new teachers and impact increasingly more students.

Presently, all College of Nursing graduate courses and one undergraduate course are deliverable in an electronic format. New courses are being developed for distance learning and content from original courses is being reformatted. Student enrollment has increased with production of new courses and external collaborations have been enhanced by the ability to teleconference and remotely monitor student progress in clinical settings. Teleconferencing and streaming video has enabled collaborations with rural and border-based health care delivery organizations.

During 2002-08, AAA recruited 12 technical experts with varied specialties needed for producing high quality distance education and high value information resources. Over \$3.4 million was secured to support projects to preserve endangered Native American languages, improve science instruction, and develop health education programs. New tools for online learning were introduced that now support over 100,000 enrollments in more

than 2000 individual courses, including an online doctorate in Nursing, the first such program in the country.

Investments in *CC* were made throughout fiscal years 2002 through 2009, funded through a proportional tax on the budgets of all other initiatives. These investments: (1) Completely renovated building network cabling and equipment for the Meinel Optical Sciences Building, (2) elevated UA Internet2 bandwidth from 155 Mbps to 1Gbps, (3) allowed The UA to join CENIC, a California based research and education network that provides access to National Lambda Rail, (4) doubled the UA's supercomputing capability, and (5) brought immersive 3D visualization technology to campus as a shared resource.

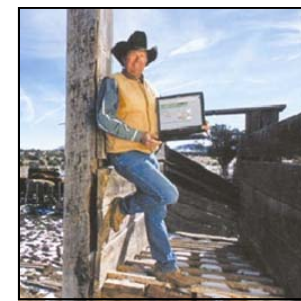
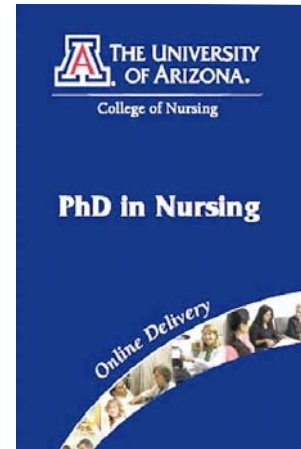
TTIP economic development measures are based upon start-ups licensing relevant UA technology, the number of those start-ups choosing to operate in Arizona, and the number of UA Technologies licensed by existing companies in Arizona. The TTIP plan metrics capture operational scope, efficiency and relevance of OTT. This includes agreements executed, patents and patent applications, and disclosures received. For some of the measures, no projections (N/P) were made in the original planning or metrics for the renewal are changing to better reflect the proposed activities. The Economic analysis by OED was designed to measure the effectiveness of the UA's TRIF initiatives as well as their economic impact on Arizona's economy and its industry clusters.

GOALS

EDP– (1) To create seamless math and science programs from elementary through secondary school, (2) to support students to enter math, science, and agricultural science teacher preparation programs, (3) to graduate over 450 of these teachers and, (4) to support program graduates to teach locally.

NOP– (1) To increase the quality and years of healthy life for Arizona's populations and contribute toward eliminating health disparities, assuring quality safe health care, and improving the public health infrastructure and (2) to reduce health disparities among Arizona's populations, particularly rural, aging, border and minority populations.

AAA – (1) To make advanced degrees and certificates available at a distance from the campus, in such fields as Nursing, Public Health, Optical Sciences, Engineering, Biological Sciences and Biotechnology, Information Resources in Library Science, Business, Law, and Education and (2) to create information resources that can increase on-the-job productivity, in resources such as Electronic Agricultural Extension, Arizona Electronic Atlas, active learning objects for K12 teachers, online library reference and digital collections, and Ask-an-Expert web sites.



The "RangeView" website, one of many resources providing what Arizonans need when and where they need it.



dMatrix, a UA startup, is a Tucson-based developer of digital pathology instruments

FINANCIAL INFORMATION

	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Actual	FY08 Actual	FY09 Revised Budget	FY09 Actual	FY10 Revised Budget	FY11 Revised Budget
REVENUE											
Carry Forward	\$ -	\$ 1,163,205	\$ 565,018	\$ 553,430	\$ 463,409	\$ 767,157	\$ 557,442	\$ 621,658	\$ 621,658	\$ 289,584	\$ -
New TRIF Revenue	\$ 2,233,439	\$ 2,305,689	\$ 2,511,957	\$ 2,616,912	\$ 3,085,923	\$ 7,951,221	\$ 9,164,277	\$ 9,807,891	\$ 8,444,713	\$ 7,099,053	\$ 7,062,094
TOTAL REVENUE	\$ 2,233,439	\$ 3,468,894	\$ 3,076,975	\$ 3,170,342	\$ 3,549,332	\$ 8,718,378	\$ 9,721,719	\$ 10,429,549	\$ 9,066,371	\$ 7,388,638	\$ 7,062,094
EXPENDITURES											
Personal Services	\$ 415,210	\$ 1,355,810	\$ 1,628,344	\$ 1,915,393	\$ 1,760,808	\$ 2,026,007	\$ 2,114,858	\$ 3,112,603	\$ 2,105,147	\$ 2,385,367	\$ 2,166,235
All Other Operating Expenses	\$ 655,024	\$ 1,548,066	\$ 895,201	\$ 791,540	\$ 1,009,036	\$ 2,734,929	\$ 3,568,734	\$ 2,573,011	\$ 3,228,290	\$ 2,003,271	\$ 1,895,859
Capital	\$ -	\$ -	\$ -	\$ -	\$ 381,200	\$ 3,400,000	\$ 3,416,469	\$ 4,743,935	\$ 3,443,350	\$ 3,000,000	\$ 3,000,000
TOTAL EXPENDITURES	\$ 1,070,234	\$ 2,903,876	\$ 2,523,545	\$ 2,706,933	\$ 3,151,044	\$ 8,160,936	\$ 9,100,061	\$ 10,429,549	\$ 8,776,787	\$ 7,388,638	\$ 7,062,094
ROI (See Note 2)	-	-	-	-	-	-	-	-	-	-	-

1) Carry forward for FY 07 consists of the following: Carry forward of \$172,938 from Technology Transfer Infrastructure; Carry forward of (3,253) from Anyplace Access for Arizonans; Carry forward of \$228,603 from Educator Development Plan; Over-realized revenue of \$350,000 for College of Nursing Online Programs; and a technical adjustment of \$18,869 from FY 06 for Critical Core Infrastructure. The total technical adjustment was \$74,891. \$56,022 was recorded under the Venture Fund.

2) As a non-research initiative and pursuant to the new March 2007 Return on Investment (ROI) policy, ROI will not be calculated in FY 2007-2011.

3) Funding of the Arizona Board of Regents' Technology and Research Initiative Fund (TRIF) is provided by a 0.6 percent increase in the Arizona sales tax rate approved by the voters through Proposition 301 on the November 2000 general election ballot.

CCI– (1) To continuously upgrade Internet connectivity to research buildings, (2) to provide access for researchers to high performance networks such as CENIC, Internet2, and National Lambda Rail, (3) to provide more, better supercomputing capability, (4) to introduce important new technologies that enable cutting edge research, and (5) to develop new research space for TRIF activities.

TTIP– (1) To enhance the technology transfer infrastructure, (2) to increase significantly the level and breadth of technology transfer from the university, (3) to increase engagement in technology transfer by the faculty, staff and students, (4) to assist efforts to commercialize university technology and (5) to connect these efforts into both State and local community economic development efforts.

MANAGEMENT

Leslie Tolbert, Vice President for Research, Graduate Studies, and Economic Development, is responsible for overall management of the University's TRIF activities. Infrastructure initiatives are coordinated by **Ronald W. Marx**, Dean of the College of Education. Individual initiatives are overseen by the following in concert with faculty, staff, and professional support personnel particular to their area of technical expertise.

EDP– **Ronald W. Marx**, Dean, College of Education

NOP– **Carolyn Murdaugh**, Interim Dean, College of Nursing

AAA– **Mike Proctor**, Dean, Outreach College

CCI– **Michele Norin**, Chief Information Officer and Executive Director, University Information Technology Services

TTIP– **Bruce Wright**, Associate Vice President for Economic Development, and **Patrick Jones**, Director of Technology Transfer

ADVISORY BOARDS

Each initiative has established Advisory Boards that provide input, review planning and operations and, more importantly, serve as a mechanism for building relationships between the UA and educational, health, science, technology, and corporate entities.

LEARN MORE

- Contact **Dr. Ronald W. Marx**, Dean, The University of Arizona College of Education, at ronmarx@email.arizona.edu or 520-621-1081.
- Contact **Dr. Leslie Tolbert**, Vice President for Research, Graduate Studies and Economic Development, The University of Arizona, at tolbert@email.arizona.edu or 520-621-3513.



3D data visualization – a critical new tool – in use to examine the physics of dust storms

EDP – Representatives from the Professional Preparation Board (PPB) include administrators from Pima College, all Tucson school districts, and faculty from all UA colleges engaged in and related to teacher preparation.

NOP– Representatives from the Arizona Rural Health Association, Area Health Education Centers, Border Health Initiatives, hospitals, Community Health Centers, long term and chronic care facilities, emphasizing rural and border areas within the state as well as individuals associated with agencies promoting distance learning for minority students.

AAA – Advisory groups include the Deans' Advisory Committee, Initiative-wide Advisory Board, Project-specific Advisory Boards, and Project and Technical Support Teams as needed.

CCI – There is no external advisory board for the **CCI**, since these investments are in service of initiatives with their own advisory boards. All IT projects are managed within University Information Technology Services, under the direction of Bob Lancaster for network projects and under the direction of Jim Austin for computing projects, both Directors of UITS reporting to the CIO. Guidance on broad strategic decisions is provided by the TRIF Executive Committee and on more tactical decisions by the Campus IT Advisory Boards.

TTIP– Four committees comprised of faculty, corporate, and technology personnel: TTIP Review Committee, Technology Transfer Advisory Committee, Arizona Center for Innovation Advisory Board, and Intellectual Property Committee.

