

ADVANCING ARIZONA

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2012



Technology and Research Initiative Fund
Fiscal Year 2012 Annual Report

September 1, 2012

As required by A.R.S. § 15-1648 (D)



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www.azregents.edu

**ARIZONA BOARD OF REGENTS
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF) ANNUAL REPORT**

For the Fiscal Year Ended June 30, 2012

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President's Letter



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Arizona State University

Northern Arizona University

University of Arizona

September 1, 2012

The Honorable Jan Brewer
Senate President Steve Pierce
Speaker of the House of Representatives Andy Tobin
Arizona State Capitol
1700 West Washington Street
Phoenix, AZ 85007

Dear Governor Brewer, President Pierce, and Speaker Tobin:

On behalf of the Arizona Board of Regents, Arizona State University, Northern Arizona University, and The University of Arizona, and in accordance with A.R.S. §15-1648(D), I am pleased to submit this Annual Report for the Arizona Board of Regents Technology and Research Initiative Fund (TRIF) for the fiscal year ended June 30, 2012. TRIF is continuously appropriated to the Arizona Board of Regents with Education 2000 (Proposition 301/November 2000) sales tax revenues pursuant to A.R.S. §42-5029(E)(2). As required, ABOR has adopted rules to administer TRIF and has incorporated these rules into Board Policy 3-412.

The FY 2012 TRIF budget provides seed-funding and support for significant research projects at all three universities. The supported research includes projects in bioscience to improve health and projects in sustainability and renewable energy, including water, solar, and forest health. At the UA, TRIF also supports space exploration and optical solutions, while at ASU it supports work with national security systems. TRIF dollars continue to support research critical to the future economic development of the state of Arizona and to a quality educational experience for our students. TRIF supported workforce development projects, especially in Arizona's high-need areas, including The University of Arizona College of Medicine-Phoenix to train more doctors to address the shortage of physicians in Arizona.

The Arizona University System's efforts to provide access to more Arizonans were supported through TRIF funding for programs such the NAU-Yuma campus; and teacher education, commerce/entrepreneurship, and information science-based programs offered in Arizona's southern border counties by The University of Arizona through a combination of on-site and distance education, to name only a few.

Board Members: **Chair Rick Myers**, Tucson **Dennis DeConcini**, Tucson **Jay Heiler**, Paradise Valley
Mark Killian, Mesa **Ram Krishna**, Yuma **LuAnn H. Leonard**, Polacca
Anne Mariucci, Phoenix **Greg Patterson**, Scottsdale
Governor **Janice K. Brewer** Superintendent of Public Instruction **John Huppenthal**
Student Regents: **Tyler Bowyer**, ASU **Kaitlin Thompson**, NAU
President **Thomas K. Anderes**, PhD

FY2012 Highlights:

ASU— The US Department of Defense's (DoD) Defense Threat Reduction Agency awarded a contract to Arizona State University to develop a novel diagnostic technology, known as immunosignaturing for rapid detection of exposure to infectious disease agents before symptoms occur. The four-year contract is valued over \$30.7M and will be led by researchers in the Biodesign Institute Center for Innovations in Medicine.

NAU— NAU received a \$2.5 million grant from the National Science Foundation for the Southwest Experimental Garden Array, a series of experimental gardens that will allow NAU researchers to study how climate change affects the plants that we all depend upon for survival. The project will be led by Regents Professor Thomas Whitham of the Merriam Powell Center for Environmental Research.

UA— The TRIF-supported iPlant collaborative received approval for non-competitive renewal by the National Science Foundation, and in FY12 began including animal genomes in their cyber infrastructure.

All TRIF-funded projects have been designed and implemented to better position Arizona as a major player in the global marketplace. Detailed business plans for each initiative have been developed and approved by the Arizona Board of Regents and are available on our website at: www.azregents.edu.

As we begin our third 5-year cycle, we will continue to remain true to the voter's intent and to state needs. We continue to seek guidance from community and foundation partners in aligning our research focus areas to maximize outcomes.

Please contact me at 602-229-2505 or Tom.Anderes@azregents.edu if I can answer any questions or provide additional information.

Sincerely,



Thomas K. Anderes, PhD
President

c: The Honorable Ken Bennett, Secretary of State
Ms. Janet Fisher, Acting State Librarian, Arizona State Library, Archives
and Public Records
Members of the Arizona Board of Regents
Dr. Michael Crow, President, Arizona State University
Dr. John Haeger, President, Northern Arizona University
Dr. Ann Weaver Hart, President, The University of Arizona

discovery

TRIF Executive Summary

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Technology and Research Initiative Fund (TRIF)

BACKGROUND

- ▶ Education 2000 (Proposition 301), passed by Arizona voters in November 2000, approved a six-tenths-cent increase in the state sales tax to be dedicated to K-12, the community colleges, and the Arizona University System (Arizona State University, Northern Arizona University, and The University of Arizona). Collection of the tax began on June 1, 2001, and will continue through June 30, 2021, under current law.
- ▶ A.R.S. §15-1648 establishes the Technology and Research Initiative Fund (TRIF) in the State Treasurer's Office and gives the Arizona Board of Regents (ABOR) the responsibility to administer the fund.
- ▶ Pursuant to A.R.S. §42-5029, the State Treasurer's Office must first allocate from Proposition 301 sales tax revenues one-twelfth of the School Facilities Board annual debt service on K-12 school improvement revenue bonds for the current fiscal year. After this monthly allocation, ABOR receives 12 percent of remaining monies.
- ▶ TRIF monies are continuously appropriated to ABOR and do not lapse at the end of the fiscal year.

TRIF BUDGET

- ▶ The Arizona Board of Regents approves the TRIF budgets and business plans in 5-year cycles. The FY 2012-2016 business plan was approved by the Board in April 2011. The FY 2012-2016 revised budgets were approved by the Board in September 2011, based on an updated sales tax forecast from the JLBC. The Board approves revisions to the annual budgets and performance measures annually. These business plans and brochures are available on the ABOR web site at: www.azregents.edu
- ▶ Projected revenue for FY 2012-2016 is approximately \$282.0 million. Total TRIF revenue received to date since the inception of the program in June 2001 is \$629.4 million.
- ▶ The TRIF statute includes a 20 percent limitation on use of TRIF funds for capital projects expenditures.

(continued)

- ▶ Pursuant to statute, each annual TRIF budget allocates funding for Certificates of Participation costs for lease-purchase of buildings and associated infrastructure at ASU Polytechnic and ASU West campuses.

TRIF INITIATIVES

- ▶ Pursuant to A.R.S. §15-1648(C), TRIF monies will be used to support initiatives and projects that meet one or more of the following criteria:
 - Promote university research, development, and technology transfer related to the knowledge-based global economy
 - Expand access to baccalaureate or post-baccalaureate education for time-bound and place-bound students
 - Implement final recommendations from the Governor's Task Force on Higher Education and/or the Arizona Partnership for the New Economy
 - Develop programs that will prepare students to contribute in high technology industries located in Arizona
- ▶ Priority will be given to proposals that involve collaboration between and among the universities and/or collaboration with private industry or public sector agencies.
- ▶ The above criteria are included in ABOR Policy 3-412, along with formats for submission of proposals and other guidelines.
- ▶ The universities' investments of TRIF funds in FY 2012-2016 will be limited to and focused in four research areas and one workforce development area:

Research investment areas:

Improving Health—ASU, NAU, UA

Water, Environmental, and Energy Solutions—ASU, NAU, UA

National Security Systems—ASU

Space Exploration and Optical Solutions—UA

Workforce development investment areas:

Higher Education Access for Workforce Development—NAU, UA

TRIF REPORTING

- ▶ A.R.S. §15-1648(D) requires the Board to submit to the Governor and the Legislature by September 1 of each year a report of prior year TRIF expenditures.
- ▶ The FY 2012 TRIF report, along with the previous reports, is available on the ABOR web site.

July 30, 2012

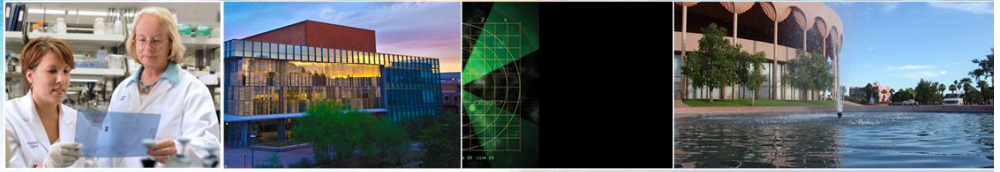
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ARIZONA STATE UNIVERSITY



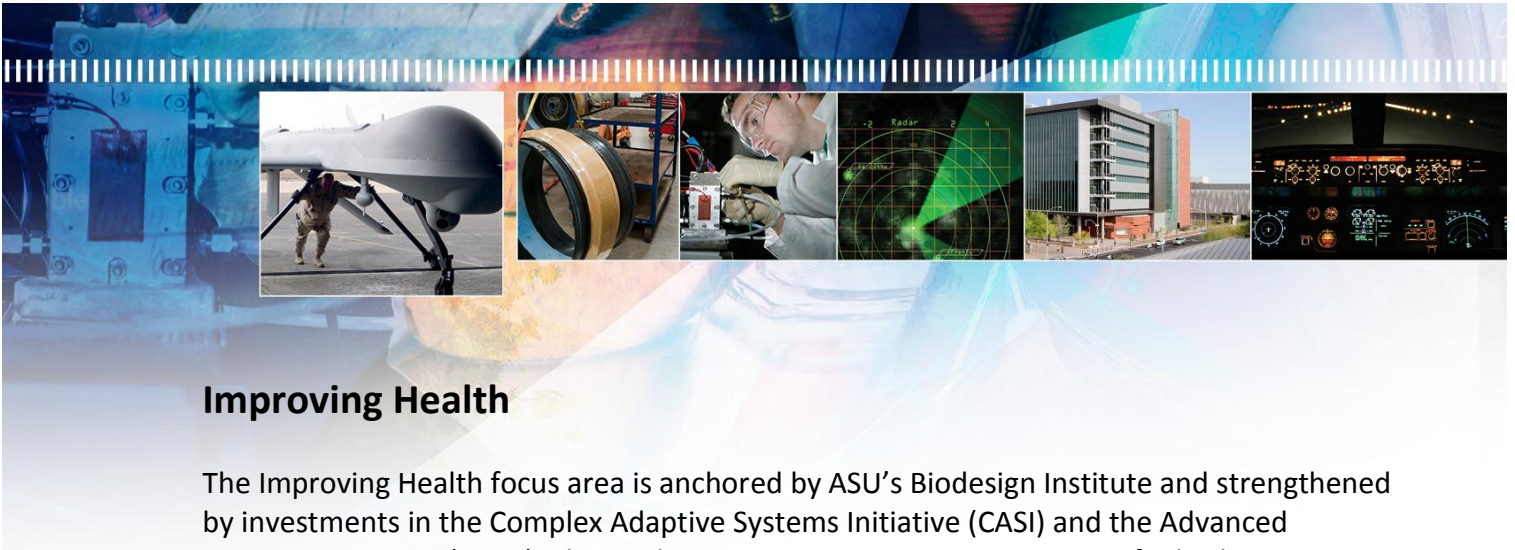
At Arizona State University (ASU), TRIF is supporting growth of the research enterprise, workforce development, student engagement, education and outreach. For the TRIF cycle of FY12 through FY16 ASU has designated three focus areas for funding. The following leverage the university's unique institutional capabilities and are aligned with ASU's long-term goals:

- **Improving Health** focuses on use-inspired, collaborative research to improve human health and the quality of life.
- **National Security Systems** is meeting the rapidly growing research and technology needs of the security and defense sector.
- **Water, Environment and Energy Solutions** is an integrated research effort focused on finding solutions to the challenges posed by urbanization and the increasing demands for energy, water and clean air.

Each focus area is described in detail in ASU's FY12 – FY16 TRIF Business Plan. ASU is pleased to present this update of FY12 TRIF activities. In the past year accomplishments as a result of TRIF investments at ASU range from the development of a flexible display prototype that is the largest in the world, to the attraction of recognized experts to ASU, training experiences for tomorrow's scientists and engineers, and infrastructure improvement. While the scope and accomplishments across the three focus areas is broad they are unified by ASU's culture of discovery and innovation. Such a foundation continues to ensure that the impact of TRIF investments at ASU is significant and far-reaching.

The Biodesign Institute is the state's largest research infrastructure investment in biosciences, a vast expansion of ASU's state-of-the-art research capacity.





Improving Health

The Improving Health focus area is anchored by ASU’s Biodesign Institute and strengthened by investments in the Complex Adaptive Systems Initiative (CASI) and the Advanced Computing Center (A2C2). The Biodesign Institute engages scientists to find solutions to critical problems in the areas of health, sustainability, and security. CASI leverages ASU’s trans-disciplinary strengths to address large-scale problems that require an integrated effort, as well as new technology and scientific directions. The advanced computing capabilities of A2C2 make possible the processing of large and complex data sets that is cost-efficient for ASU researchers and industry partners.

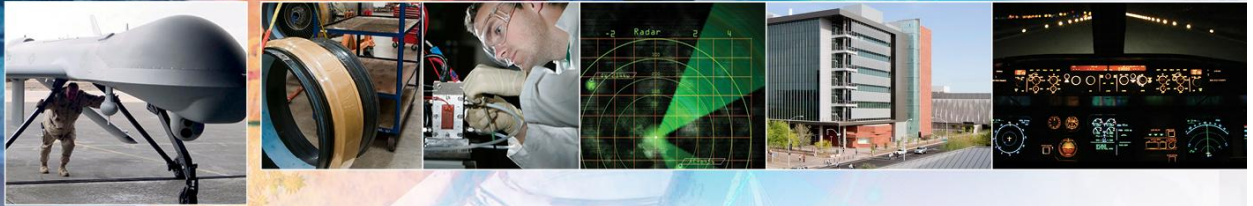
These programs form the trans-disciplinary research and data processing framework of the Improving Health focus area. Through this framework TRIF investments are enabling researchers to create bio-inspired and use-inspired solutions.

Goals

- The Biodesign Institute’s objective is to address today’s critical global challenges in healthcare, sustainability and security by developing solutions inspired from natural systems and translate those solutions into commercially viable products and clinical practices.
- The research mission of CASI is to develop and promote a new science of biosocial system dynamics that use a complex systems paradigm, computation thinking, and quantitative methods to forge a new and holistic understand of life and society.
- A2C2’s goal is to transform advanced computing solutions, in a cost-effective manner, to support the university’s mission and goals as they apply to research, education, and public service.

The Biodesign Institute anchors the Improving Health focus area and operates with a mission statement of “addressing today’s critical global challenges in healthcare, sustainability and security by developing solutions inspired from natural systems and translating those solutions into commercially viable products and clinical practices.





Summary of Accomplishments

Strategic growth and capacity building in the Improving Health focus area has occurred through partnerships and collaborations with some of the world's leading institutions. This includes the Mayo Clinic, TGen, Intel, Honeywell, Raytheon and several U.S. and foreign universities. These relationships provide opportunities to enhance and expand ASU's research impact.

Workforce development is also a significant outcome. Programs provide education and bioscience training that support high-tech and high-paying jobs in the state. In FY12 TRIF supported the employment of faculty and staff and provided a training pipeline for postdocs, graduate students and undergraduates. Public outreach events included the Night of the Open Door community event, hosted by the Biodesign Institute, and ASU's participation in the Arizona SciTech Festival as well as training courses offered by A2C2 to students and educators in the community.

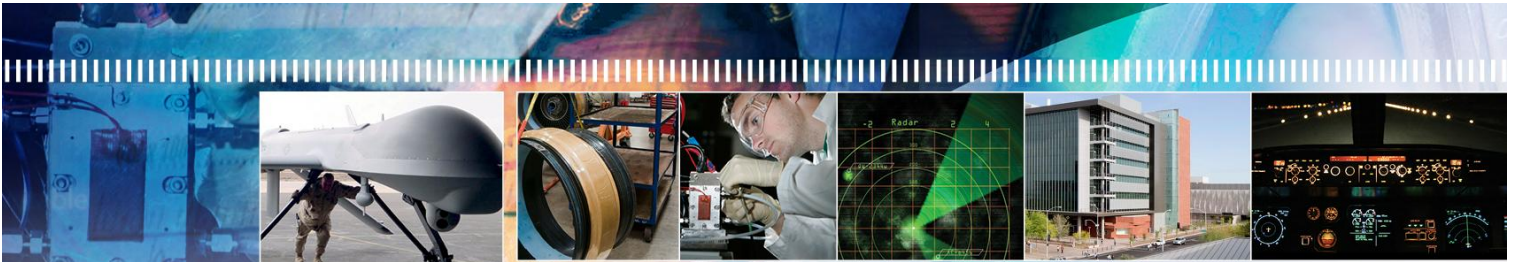
Results - Impact

- The Biodesign Institute's Center for Innovations in Medicine received a \$30M contract from the Defense Threat Reduction Agency of the U.S. Department of Defense (DOD) to develop a silicon-chip based technology capable of detecting a broad range of infectious organisms.
- The Virginia G. Piper Charitable Trust committed a three-year, \$3M award to expand Biodesign's Center for Sustainable Health.
- Discoveries made at the Biodesign Institute resulted in the establishment of two companies: Arbsource and TF Health Corporation.
- Technology developed at the Biodesign Institute by Stuart Lindsay, in collaboration with Colin Nuckolls of Columbia University, has been licensed by Roche, the world's largest biotech company, for improving the process of DNA sequencing.

A DOD contract with the Center for Innovations in Medicine will engage scientists from the Biodesign Institute and CASI to create a novel diagnostic technology called immunosignaturing. This will enable rapid detection of infectious disease agents. Speaking on the importance of the research that will be conducted, George Poste, CASI chief scientist, said that early detection enables rapid deployment of treatment and implementation of infection control measures to save lives while limiting further spread.

While this project seeks to develop technology to protect military personnel against bioterrorism, it is expected that immunosignature profiling will also create major advances in the detection of infectious diseases in other settings.





National Security Systems

The National Security Systems focus area at ASU guides strategic research and technology-based solutions for the security and defense sectors. As a direct result of TRIF investments, ASU established the Security and Defense Systems Initiative (SDSI) which addresses national security in the key areas of technology, law and policy, and socio-cultural and economic roots. SDSI is a broad, large-scale research effort that brings together faculty from diverse disciplines and research programs. The Flexible Display Center (FDC) continues to meet the milestones set forth by its primary funding sponsor, the U.S. Army, including the establishment of numerous successful partnerships with government, industry, and academic partners. Drawing on these resources and collaborations, this focus area is uniquely positioned to meet the growing needs of the national security research and technology development sector.

Goals

- Complete the formal establishment of ASU Research Enterprise (ASURE), SDSI's off-campus research center.
- Accelerate the submission of research funding proposals to exceed \$25M across all SDSI Research Thrust Areas for the coming year.
- Secure at least three early substantial research funding awards in SDSI key Research Thrust Areas totaling more than \$10M.
- FDC will advance full color, video-rate, flexible display technology and continue to fulfill its 10-year cooperative agreement with the U.S. Army while also building capacity for continued research and production.

"SDSI is based on an organizational structure designed to enable an unprecedented level of partnership between the university, government, and industry in the security and defense area."

-Werner Dahm, Director of SDSI





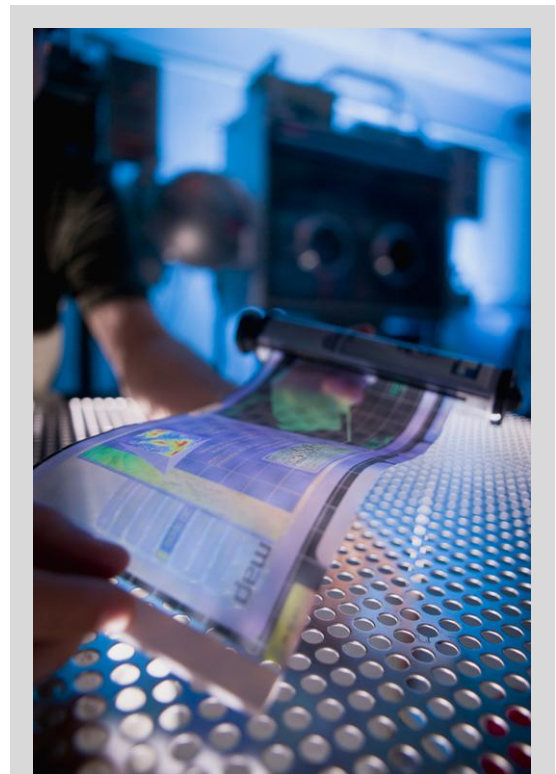
Summary of Accomplishments

The National Security Systems focus area leveraged on- and off-campus activities and facilities to pursue research and development, established successful partnerships and contributed to the development of a high-tech workforce. In addition to its on-campus facilities, SDSI worked towards establishing ASURE off-campus, which has the security clearance to conduct research with high technology readiness levels (TRL). Together with the FDC laboratories, these facilities broaden ASU's research capabilities and position the university for more competitive high-dollar, high-impact contract agreements.

Developing multiple avenues of collaboration within the initiative has been another key activity. Researchers are working across disciplines, between the on- and off-campus programs and with partner organizations. These collaborations enhance the real-world relevance of the research as well as the education experience of students and postdocs supported by the focus area. Through this focus area, ASU is strengthening the security and defense sector in Arizona and building the workforce capacity to support it.

Results - Impact

- FDC manufactured the world's largest flexible color organic light emitting display (OLED) prototype.
- \$12.6M was received by FDC for continuation of the U.S. Army contract bringing the total investment to \$84.9M over the past nine years.
- SDSI is involved in a statewide proposal effort to make Arizona one of six Federal Aviation Administration designated unmanned aircraft system test sites in the nation.
- SDSI intends to partner with Alion Science and Technology Corporation on a \$638M DOD proposal. If awarded, the project would involve 73 faculty members from ASU.
- SDSI submitted a \$12.7M proposal to the U.S. Navy for development of an Autonomous Aircraft Cargo Utility System.



Measuring 7.4 diagonal inches, the OLED prototype developed by FDC is the largest in the world.



Water, Environment and Energy Solutions

Increasing urbanization and population growth creates great demands on our environment and leads to economic, social and technological challenges. The TRIF-supported Water, Environment and Energy Solutions focus area at ASU supports research, discovery, and outreach that generate solutions to these challenges. The primary efforts of this initiative are the Global Institute of Sustainability's (GIOS) Water and Environmental Sustainability program, LightWorks, and the Decision Theater.

The Water and Environmental Sustainability program at GIOS is contributing to our understanding of how we value water and its function in ecosystems – from water quality and quantity to recreation and tourism – and what that means for ensuring a sustainable water supply. LightWorks provides the strategic framework that focuses ASU's light-inspired research and leverages ASU's unique strengths, especially in renewable energy fields. The Decision Theater uses a combination of visualization, simulation, and collaboration tools to communicate complex information to decision makers. With the support of TRIF investments, each of these programs is contributing to ASU's trans-disciplinary approach to renewable energy and sustainability.

Goals

- The Water and Environmental Sustainability Program is part of the GIOS mission, which includes identifying the grand challenges of sustainability, advancing knowledge for applied practical solutions, and creating new tools for improved decision-making.
- LightWorks is focused on research and development of applications for low-cost, high efficiency solar panel technologies; renewable biofuel and biohydrogen production; fungible fuels from CO₂, water and sunlight; and policy and energy education.
- The Decision Theater's mission is to enable better decision making through system-science and technology-based collaborative experiences and to provide a place where academics, leaders and decision makers come together to address real-world challenges.

LightWorks consolidates the research activities of light-inspired research at ASU under one strategic framework. It is a multidisciplinary effort to leverage ASU's unique strengths, particularly in renewable energy fields including artificial photosynthesis, biofuels, and next generation photovoltaics.





Summary of Accomplishments

The impact and potential of research supported by the Water, Energy and Environment Solutions focus area is foreseen in the successful recruiting efforts of the past year, including: Kristin Mayes, who served on the Arizona Corporation Commission and at ASU is directing the Program on Law and Sustainability and the Energy Policy Innovation Council; Ellen Stechel, the new Deputy Director of LightWorks as well as a Professor of Practice in the Department of Chemistry and Biochemistry, who brings 17 years of experience from Sandia National Laboratories; and Ken Galluppi, who will serve as the director of the Decision Theater and has extensive experience in decision science and informatics as a senior research scientist at University of North Carolina.

Outreach efforts include the Energy Policy Innovation Council, which conducts research, analyzes policy, and facilitates meetings with Arizona energy policy makers, as well as the ASU Energy Club, which engages students in energy sector issues. The Arizona Solar Summit is another outreach effort that was created to bring people and organizations together to advance the solar energy industry on regional and national scales. The Summit launched the building of a network designed to address specific challenges that, if met, will propel Arizona to national prominence in the solar energy market.

Results - Impact

- GIOS received a \$27.5M gift the Rob and Melani Walton Fund of the Walton Family Foundation. This gift supports GIOS research and outreach, including the Water and Environmental Sustainability program.
- \$1.6M was received from the Department of Energy's ARPA-E program for the continuation of research into cyanobacterial-based biofuels.
- 120 people from 70 organizations attended the 2012 Arizona Solar Summit to discuss, in part, how states can work together with federal agencies to develop a solar future.
- Over 36 graduate students conducting research in the areas of artificial photosynthesis, photovoltaic power management and novel materials, carbon capture, and energy grid modeling were supported in FY12.



"I think this is a fantastic opportunity to take sustainability to a new level in Arizona and throughout the country."

-Kristin Mayes, Professor of Practice and Faculty Director of the Program on Law and Sustainability

Prior to joining ASU, Mayes helped co-author the Arizona Renewable Energy Standard while she was a member of the Arizona Corporation Commission.

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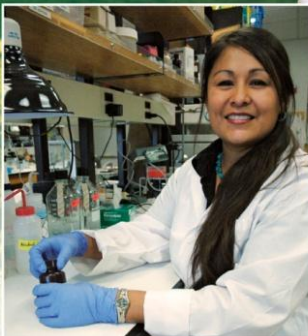
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**NORTHERN ARIZONA
UNIVERSITY**



Introduction

In spring of 2011, the Arizona Board of Regents approved four initiatives under Northern Arizona University's FY12-16 Business Plan.

WATER, ENERGY, AND ENVIRONMENTAL SOLUTIONS (WEES)

Arizona's diverse and spectacular landscapes are the pride and passion of many of its citizens. At the same time, rural areas suffer from high unemployment and limited economic development, and the state's arid and semi-arid landscapes are particularly vulnerable to wildfires, and natural resource conflicts. NAU's WEES initiative, *Solutions for Arizona's Rural Landscapes*, encourages and supports rigorous scientific research and sound scientific and technical support to minimize catastrophic wildfire risks, rebuild a forest products economy, promote collaborative conservation planning and analysis using landscape-scale spatial data, and to convene rural and tribal community stakeholders to explore economic alternatives, such as renewable energy development.

The *Climate and Energy Solutions* initiative explores and evaluates energy development and environmental context in Arizona. Northern Arizona University's strength in environmental science and policy, climate science, and wind energy, and the collaboration between stakeholders, communities, and tribes serves as the foundation for increasingly visible and ambitious programs that contribute to building Arizona's economic future. Under this initiative, NAU supports research and research training activities in the Merriam Powell Center for Environmental Research as well as the newly established Sustainable Energy Solutions Institute.

IMPROVING HEALTH

The overall goal of NAU's Improving Health initiatives is to support projects and activities whose outcomes strengthen and expand Arizona's biosciences economy. NAU is making significant investments in both technology transfer capacity as well as research projects designed to result in tangible intellectual property that can be commercialized. Investments in FY12 included individual research projects and investments in campus-wide research capacity in the form of new postdoctoral associates, shared research equipment and establishment of a rapid prototyping laboratory.

ACCESS AND WORKFORCE DEVELOPMENT (AWD)

Northern Arizona University's AWD initiative addresses the needs of Arizona employers and their current and future employees to support the economic development of the state. The components include the development and delivery of courses and degree programs to support workforce development in program areas such as health, teacher education, and business and nonprofit managers; and the use of technologies to increase student achievement, accelerate student progress through degree completion and enhance efficiency across university courses and programs.



WATER, ENERGY & ENVIRONMENTAL SOLUTIONS (WEES)

Arizona's TRIF investment in Northern Arizona University under the WEES initiative funds a number of new projects designed to identify and catalyze economic opportunities for Arizonans that sustain environmental and social values. Activities in FY12 leveraged our historical strengths in environmental science and policy, climate science and wind energy for visible and ambitious projects that contributed to building Arizona's sustainable future.

Goals

- Ecological Restoration Institute.** Provide leadership in the development of solutions to the costly environmental problem of degraded forest health, water quality and availability and alternative energy fuel in the form of biomass and biodiesel. Contribute to workforce development by providing quality undergraduate and graduate funding, fieldwork, and education in forest restoration.
- Landscape Ecology Conservation Institute.** Through the establishment of this new institute, engage students, decision makers, and the public in meaningful dialog, grounded in robust science, to help forge solutions to landscape conservation and sustainable community development.
- Institute for Sustainable Energy Solutions.** Establish a new institute to build the research base at NAU through increased opportunities for proposal submissions and acceptance with external partners. The strategic participation in regional and national meetings will develop collaborations with researchers at other Arizona universities and prominent research universities nationwide.
- Merriam-Powell Center for Environmental Research.** Expand and market the availability of field stations, experimental arrays, and facilities for geospatial analysis and biodiversity studies. Such expanded capability and visibility will be aimed both at increased leveraging of grant funding and at a transition toward self-sustaining status for the field stations and facilities.
- Four Corners Sustainable Futures Initiative.** Develop and implement sustainable economic development strategies with the direction of tribal leadership to explore the potential for sustainable economic development on tribal lands in the Four Corners.



The 2010 Schultz Fire severely burned approximately 15,000 acres. Although the fire was traumatic, the post-fire flooding is in many ways more devastating to the community.



Environmental Science Research Experiences for Undergraduates (REU) program participants conduct research at sites near the Merriam-Powell



Summary of Accomplishments

In FY12, NAU invested TRIF funds in projects whose outcomes were intended to stimulate the state's economy through innovation and partnerships in sustainable solutions research, education and technical assistance. WEES at NAU provided quality undergraduate and graduate training, fostered developments in forest restoration and health, and developed alternative energy technologies suited to develop Arizona's economy.



SES students Matt Acker, Adam Nelessen, and Marilla Lamb measure solar resources near Cameron,

Results – Impact

- NAU convened a summit of Arizona tribes and leaders in federal and local governments to identify 36 potential sustainable economic development activities and identification of implementation priorities.
- Developed relationships and collaborations between land owners and public land managers to successfully implement economic diversification on rural ranchlands.
- Leveraged more than \$529,000 in funding for alternative energy research and technical assistance with communities around the state, including projects with the US Department of Energy, APS, and Salt River Project.
- Obtained a gift of \$1.5 million to establish the Charles Olajos and Ted Goslow Endowed Chair in Southwestern Environmental Science and Policy. Dr. Thomas Sisk, Director of the Landscape Conservation Initiative was named to this Chair in May, 2012.
- Created the Kane and Two Mile Ranches Research and Stewardship Partnership between the landscape and ecosystems conservation institute and Grand Canyon Trust, US Forest Service, Bureau of Land Management, Department of Arizona Game and Fish, US Geological Survey, and University of Arizona.
- Established a partnership with Pioneer Associates, the recipient of the largest-ever stewardship contract (forest thinning) from the U.S. government. The wood from the 300,000 acres to be cleared over the next ten years will feed a wood products plant opening in Winslow by the Fall of 2012 and is expected to create 600 new jobs. In FY12, NAU's Ecological Restoration Institute began working with the contractor to provide assistance in workforce training and biomass development.
- Developed the Southwest Experimental Garden Array for Integrating Genetics and Climate Change to examine how genotypes perform under different climate conditions. In October, this project received a \$2,500,000 grant through the National Science Foundation Major Research Instrumentation program.

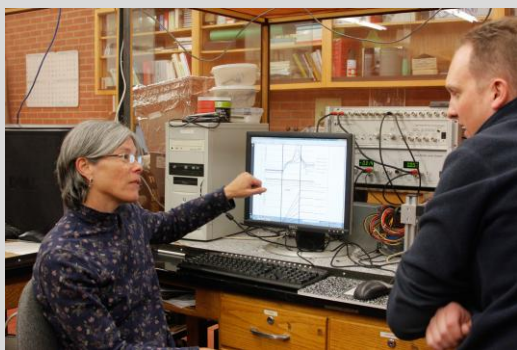


IMPROVING HEALTH: Investing in Biotechnology and Bioengineering

The mission of the initiative is to strengthen the university as an innovator and facilitator, translating biotechnology and bioengineering into economic activity. Goals of the initiative include appropriate commercialization of university innovation, creating businesses and jobs, building strong regional economic development partnerships, implementing curricular innovations, and generating external funds to retain and expand the university's intellectual capacity.

Goals

- **Build Capacity in Technology Transfer.** Up until FY12, Northern Arizona University's technology transfer activities were largely conducted by a combination of outside organizations and consultants (e.g., such as through the Northern Arizona Center for Entrepreneurship and Technology) supported by in-house staff. However, in order to maximize the potential economic benefit of the outcomes of NAU research through commercialization, NAU set out in FY12 to strengthen internal capacity so that technology transfer at NAU is managed by a professional in-house staff which utilizes outside entities such as NACET and NAU Ventures (a subsidiary of the NAU Foundation) for supporting activities.
- **Catalyze development of tangible intellectual property (IP).** Providing project-based grant support at all of the various—especially the early, proof-of-concept—stages of IP development.
- **Build institutional capacity to expand bioscience research.** Establishment and implementation of competitive grant programs designed to make significant, targeted investments in research infrastructure that will result in tangible outcomes that grow the research enterprise and allow NAU researchers to compete more effectively for external funds.



Kiisa Nishikawa, Regents Professor, and graduate student Kit Wilkinson discuss the results of the applied test forces on an actuator bench model. The actuator mimics muscle behavior in response to applied forces, based on the winding filament properties of the large protein, titin, the driver behind spring-like properties of muscles.

- **Establish a state-of-the-art, rapid prototyping facility.** As NAU has placed a greater emphasis on generating tangible intellectual property, researchers across campus demonstrated the need for a facility that would provide design and manufacturing expertise and equipment and assist in the reduction to practice of innovations coming out of NAU.
- **Investment in the Center for Microbial Genetics and Genomics.** Investments aimed at enhancing synergies between Northern Arizona University and the Translational Genomics Research (TGen) Institute through the support of individuals jointly appointed.

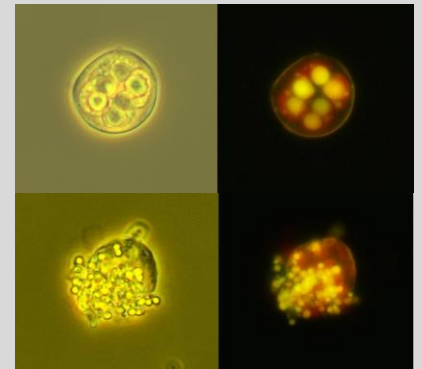


Summary of Accomplishments

By encouraging interdisciplinary research and innovation in biosciences and biotechnology, the TRIF investments made through the Improving Health initiative will strengthen and expand NAU's contributions to Arizona's economy. The development of new technologies enables translation of research into applications and solutions that address health, technology, and sustainability in ways that affect individuals across Arizona and the nation.

Results-Impact

- Licensed an online training and certification system to a start-up company, Holistic Technology Services, LLC, established by an NAU employee.
- Equipped the NAU Rapid Prototyping Lab with state-of-the-art prototyping equipment not otherwise available in northern Arizona. In Spring of 2012, the lab's faculty director and three mechanical engineering students produced prototypes for a client company of the Northern Arizona Center for Entrepreneurship and Technology (NACET).
- Established an inter-institutional partnership with the University of Victoria (British Columbia) for the joint development, ownership and exploitation of intellectual property.
- Led an academic exchange visit to Johns Hopkins undergraduate campus, School of Public Health and Medical campus with selected undergraduate students.
- Recruited Dr. Jason Sahl to NAU/TGen to enhance bioinformatics capabilities, training of students and to provide expertise in infectious disease research.
- Established a partnership and joint ownership of intellectual property with a NACET client. This activity involved a capstone student project and engaged four electrical engineering students. The NACET client company has expressed interest in hiring 2 or more of these students after graduation.



Zygosporos provide a rich source of lipids for biodiesel production but have not been considered as a commercial source due to the difficulty of recovering lipids from the heavily walled spores. Karen VanWinkle-Swift, Emeritus Regents Professor, has identified a fragile stage in zygospore germination and can tap into the spore lipid reserve.



Undergraduate Tanya Sutton works in the lab to discover gene expression biomarkers for thyroid hormone disruption.



ACCESS/WORKFORCE DEVELOPMENT

One of Northern Arizona University's strengths is access and workforce development. For over 30 years, NAU has served rural and urban communities throughout Arizona, providing opportunities for place- or time-bound citizens to continue their educational progress. Three-quarters of NAU's Extended Campuses students work at least 32 hours per week.

The Access/Workforce Development (AWD) initiative at NAU continues to be instrumental in preparing Arizona's workforce. By dedicating resources to high demand fields in the business and non-profit sectors such as education and health professions, NAU has successfully prepared thousands of students to meet the needs of Arizona employers. Through technological advancements, innovative and strategic program delivery, and partnerships in communities throughout Arizona, the AWD initiative has provided place-bound students access to education and subsequent employment, and TRIF funding has provided the resources needed to expand these programs to reach more communities at affordable tuition rates. NAU's commitment to access and affordability, coupled with the AWD objectives, has resulted in a financially viable approach to educating Arizonans.



"I did not have to move to go to school at NAU-EC. My professors were amazing. They were all professionals in their field with lots of practical knowledge and most of them had their doctorate, or were pursuing them. They were great role models and inspired their students to keep striving and appreciate what our education could lead to eventually. I keep in touch with some of them. Further, with EC, it was less expensive than going to the main campus," **Nicole Deopere** said.



"The well-rounded course work, from data interpretation to public planning, was useful with decision-making processes. Using the skills learned during attending NAU-EC at SMCC, I was able to implement effective plans and continue to use the skills today," **Robert Nino** said.

The overall goal of AWD is to make quality programs available in locations and through delivery methods that suit the needs of the students. Thirty-six rural and urban sites offer face-to-face contact, a wide variety of on-line and hybrid programs, and innovative scheduling to support student learning while balancing work and other commitments. Courses can be completed in as little as seven weeks (over 100 separate courses were offered in this format in 2012) and many programs allow students to transfer as many as 90 credit hours from an Arizona community colleges, leaving only 30 units to complete a bachelor's degree at NAU.

These transfer-friendly programs represent the most affordable four year degree option in the state of Arizona. Students can also receive admission, enrollment, payment, and other services in person and through the Extended Campuses Service Center, which is available by toll-free phone, email, and online chat. More details on the size and outcomes of these programs can be found on the AWD metrics page.



Under AWD, Northern Arizona University’s partnerships with Arizona community colleges continue to thrive. The newest program, 2NAU, has recently been recognized by the Arizona Commission for Postsecondary Education’s Arizona College Access Network (AzCAN). The 2NAU program admits students at NAU while they complete their first two years at a community college, thereby promoting degree completion both at the community college and at NAU. 2NAU is designed to remove obstacles to higher education by increasing access to guidance, support and resources for students the program directly impacts. The 2NAU joint admission program, established between NAU and almost all Arizona community colleges, was awarded the 2011 Pathways to Postsecondary Education Award.

A new NAU program with Arizona community colleges is reverse transfer. Students who have attended a community college and transfer to NAU before attaining a degree may transfer courses from NAU back to the community college and earn their associates degree while continuing to work towards their baccalaureate. This program provides a student with a degree that enhances their ability to get a job or to advance in their current job.



“I started off at the community college as a student worker. After I earned my degree, I moved to a fulltime employee. I plan to continue my career within the community colleges because I enjoy working with students, staff and community,” **Franklene Smith** said.



“The classes I have taken at NAU, including mediation and conflict, advanced presentations skills, leadership with organizations and cultural diversity are applied to this internship. At NAU, I have been exposed to positive leadership and a scope of viewpoints I could have never experienced otherwise,” **Courtney Pigaga** said.

E-LEARNING

The e-Learning initiative was established in 2001 with the purpose of increasing the opportunities for Arizona citizens to participate in, contribute to, and benefit from the “New Economy” of the 21st century that is predominantly knowledge and technology based. During FY2012, NAU offered 1,917 online course sections with average enrollment of 24 and overall total enrollment of 45,595. Hybrid (or blended) numbers were 609 course sections with 22,057 enrollments.

- Developed 34 new online and 11 hybrid courses.
- Developed and implemented training modules for the new Learning Management System (LMS)
- Addition of and training for new technologies in classrooms, including Blackboard Learn, Blackboard Collaborate, Blackboard Voice, Personal Response System, and iTunes U sites
- Facilitation of the ninth annual Southwest Institute for Learning with Technology to focus on “Blended Learning: Designing Learning Activities for Hybrid Course Delivery.”

NAU e-Learning works with a variety of projects across the university, including college and departmental conferences and events that e-Learning supports with technical and pedagogical expertise to enhance the learning across the university at all levels.

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innovation

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discovery

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creativity

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opportunity





At the University of Arizona, TRIF supports innovative research efforts in critical high-technology areas; the translation and application of research results to practical uses that benefit the health, security, and prosperity of Arizonans; and the education of students—from middle-school to graduate school—who will be the next generation of innovators, capable of meeting the challenges of the twenty-first century.

TRIF activities fall under four initiatives:

- **Improving Health** supports UA researchers who are tackling complex and pressing health problems of critical importance to Arizona and the nation. The initiative also supports work that is addressing major challenges in the agricultural sciences. With a focus on bioinformatics and clinical translation work, we are building the faculty and infrastructure to transfer research breakthroughs into applications that directly benefit society.
- **Optics and Space Sciences** continues to support applied research and commercialization in our top-ranked optics and space sciences programs. Through joint faculty appointments, cooperative research initiatives, and multidisciplinary outreach events, the Optics College partners with the Colleges of Science, Engineering, and Medicine to develop new technologies in nearly every field of science and technology.



*Leslie Tolbert, Ph.D., Senior Vice
President for Research*

“TRIF funding to the UA provides critically needed support in areas of high strategic value to the University and to the community. The funds are used to hire new faculty, seed new research collaborations, move promising research findings toward commercial use, and engage students at all levels.”

- **Water, Environment, and Energy Solutions** seeks sustainable solutions to Arizona’s water, environmental, and energy resource challenges, with potential for far-reaching societal benefits. WEES supported nine new faculty hires to enhance UA’s strengths in environmental science, engineering, and policy. WEES projects aim to secure adequate supplies of clean water for Arizona’s economic vitality and the health of its residents, optimize sustainable use of its lands, and create a vibrant renewable energy industry.
- **Tech Launch Arizona**, a new technology commercialization center, aims to consolidate efforts that move UA discoveries from the lab to the marketplace, providing a more direct avenue for UA inventions to be licensed to companies. Tech Launch Arizona will streamline the translation of research results to practical applications and help the state foster a knowledge-based economy for the twenty-first century.



IMPROVING HEALTH

Arizona's TRIF investment in the University of Arizona funds research to improve the lives and health of its citizens, while creating high quality jobs in the state's expanding bioindustry sector. The UA has world-class bioscience labs and the potential to use the new knowledge created there to develop novel and exciting medical and agricultural products. Our ultimate goal is to leverage the partnership of UA scientists and local entrepreneurs to attract fresh investments that will transform Arizona into a hub for knowledge-based economic development around bioscience, medicine, and agriculture.

Researchers are identifying potential pharmaceutical targets that emerge from work in UA basic science labs. BIO5 chemists are creating small molecules aimed at these targets in our BIO5 Oro Valley drug development program.



Goals

- *BIO5 Institute* – Foster collaborations to address major scientific challenges in the life sciences, develop new knowledge, therapies, and devices to improve lives, and develop small, regional companies and jobs.
- *iPlant Collaborative* – Create a cyberinfrastructure that makes new tools and communication models available to speed research in life sciences and to ultimately address global hunger and food-related disease.
- *Clinical and Translational Science Institute* – Advance methods and therapies to prevent and treat disease by attracting and nurturing outstanding clinical scientists.
- *Education, Outreach, and Training* – Expand our training programs, increasing the number of science teachers and schoolchildren involved in our community-based biotech programs and the number of high school students engaged in biology labs throughout the UA via the summer KEYS program.

With the Helios Foundation, BIO5 offers extension programs such as Jr. Biotech to introduce Arizona middle school students to biological research. The Keep Engaging Youth in Science (KEYS) Program allowed 36 high school students to spend seven weeks in UA labs across the biological spectrum.



"I've been exposed to a world that I never knew existed and learned my work can have an impact. KEYS has also expanded my mind, because I now know that I want to pursue biomedical engineering."

Vicram Vettiyil, KEYS Intern





Summary of Accomplishments

During the last year, UA recruited 15 new physician-scientists and translational researchers. These faculty members address areas of great importance for Arizonans, such as sudden cardiac death, lymphoma, diabetes, complementary and alternative medicine, middle-ear diseases, brain toxoplasmosis, Parkinson's disease, and the creation of hypoallergenic foods. In addition, we contributed to the recruitment of experts in bioinformatics and cyberinfrastructure.

At the BIO5 Oro Valley site, we have developed an intense process of partnering and collaborating with current UA scientists. As a result, seven new and promising molecular targets have been identified in respiratory disease, cancer, and other areas, which could eventually result in new products licensed to locally grown or global pharmaceutical companies.

The NSF-funded iPlant Collaborative has been highly successful in developing tools to be used in big-data analysis to solve major challenges in agricultural sciences. The Collaborative intends to lead the development of a larger program to extend its work to all the life sciences.

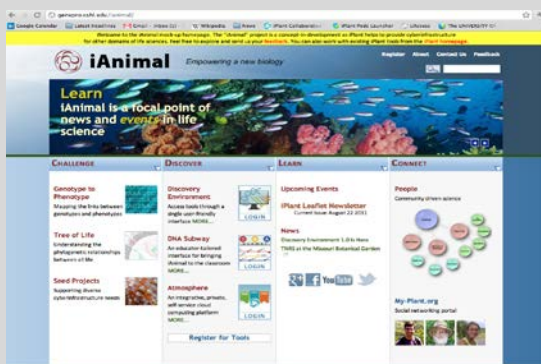
BIO5 continues to be a prime source of funding for pilot collaborative studies at the UA. In FY 2012, BIO5 awarded eight small pilot project grants in the life sciences and three technology innovation seed grants.



Through partnership with the UA Cancer Center and College of Medicine, TRIF funded the recruitment of Dr. Schatz, an expert in the field of lymphoma and Hodgkin's disease. Currently Dr. Schatz is working on new anticancer drugs that target oncogenic signaling molecules.

Results – Impact

- Leveraged \$60 million in funding from NSF, NIH, and other sources.
- Leveraged iPlant and College of Science faculty to develop a new, innovative course in plant breeding at BIO5 for both industrial and academic scientists.
- Reached over 49,000 students through the Jr. Biotech program, KEYS, and undergraduate/graduate internships.
- Assisted in 15 faculty hires.



Scientific, biomedical, and engineering research is undergoing a profound transformation with the availability of large-scale, diverse, and high-resolution data sets. TRIF supports BIO5's role as a home for large projects in cyberinfrastructure for the life sciences.

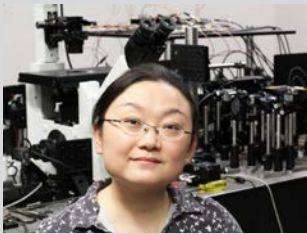


OPTICAL SCIENCES and TECHNOLOGY

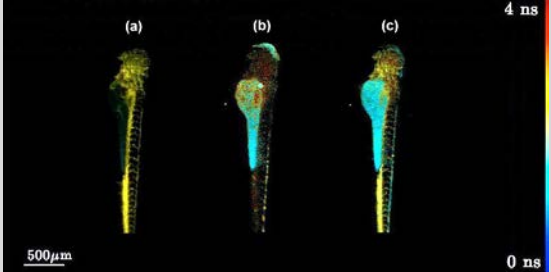
The TRIF Optical Sciences and Technology Program seeks to expand educational opportunities for students in optics, incubate novel research directions, and have an impact on regional economic development by leveraging the University's world-renowned optics education and research resources.

Goals

- Leverage TRIF funds to obtain at least a ten-fold return on investment through increased external research funding.
- Identify and support key faculty hires in Optics in strategic areas of need and/or opportunity across the University of Arizona campus.
- Create new shared imaging and photonics infrastructure and facilities that broadly benefit the research and education mission of the University.
- Support workforce development directly through increased student fellowships and enhance the University's outreach to companies and under-represented populations in Arizona to help increase the number of trained minority students.
- Encourage technology transfer, help in the creation of new start-up companies, and expand innovation activities.



*Leilei Peng, Ph.D.,
Assistant Professor,
Optical Sciences*



"I have leveraged my TRIF support to secure \$1.73M of NIH research grants and launch a program targeting novel biological imaging technologies. In the example above, we are developing unique optical instrumentation for deep tissue 3D imaging of multiple signaling pathways in live whole organisms such as zebrafish."

Summary of Accomplishments

The TRIF Optical Sciences and Technology Program made strong advances in education, research, and outreach in FY 2012.

In the focus area of *Imaging*, TRIF funding provided essential test infrastructure to launch an exciting initiative by Daniel Morrone, Assistant Professor in Astronomy. Dr. Morrone was recently awarded a National Science Foundation Advanced Technology and Instrumentation grant to expand the South Pole Telescope in ways that will allow it to take the first picture of the boundary of a black hole. The College of Optical Sciences used TRIF support to recruit Dr. Amit Ashok to start a new research program in computational optics. Dr. Ashok succeeded this year in establishing promising new research contracts with the Department of Defense for advanced multispectral compressive imaging, and with Raytheon and Canon to explore commercial applications. The College of Optical Sciences supported Dr. Leilei Peng with TRIF salary and equipment through summer 2011. The investment paid off well, with Dr. Peng recently receiving two new National Institutes of Health grants to develop new biological imaging instruments.

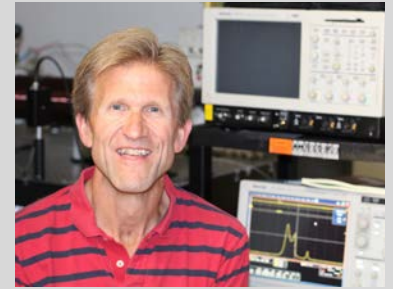


Summary of Accomplishments (cont'd)

In *Photonics*, the College of Optical Sciences was able to use TRIF support to recently attract new faculty member Dr. Milorad Cvijetic in photonic communications systems, seed a new collaboration on new fiber lasers with regional partner Canon, and seed an exploratory new all-optical switching technology with the Department of Defense. TRIF funding was also invaluable in initiating the \$14.6M in National Science Foundation funding received to date for the Center for Integrated Access Networks (CIAN) Engineering Research Center led by ERC Director Nasser Peyghambarian.

TRIF support is also critical to *major shared infrastructure* across the campus. A prime example is the purchase of a new research-dedicated 3 Tesla Magnetic Resonance Imaging instrument that will enable broad collaborative investigations of advanced MRI imaging applications in neuroscience, cancer, and cardiovascular research.

The TRIF Optical Sciences and Technology Program also continued to excel at workforce development. It provided: salary support to 44 graduate and post-doctoral students in the Colleges of Science, Engineering, and Optical Sciences during the past year; student support to participate in national industry/academia workshops; and support for outreach efforts such as the Math, Engineering and Science Achievement (MESA) Saturday Academy, Research Experience for Undergraduates, Women in Optics and the annual Optical Sciences Camp, and the Technology Advisory Committee at Pima Community College.



*Robert A. Norwood, Ph.D.,
Professor, Optical Sciences*

“TRIF funding has enabled our preliminary investigations of new all-optical switching ideas based on optical fibers filled with nonlinear optical liquids. This work has led to \$1.2M of funding from the Defense Advanced Research Projects Agency, and has already been extended to applications in fiber lasers, Raman generation, metrology, and new fundamental optical physics measurements.”

Results – Impact

- New TRIF-seeded research funding totaling \$49.4 million.
- Funding for 44 graduate student research assistantships and post-doctoral researchers.
- Four new faculty hires in areas of strategic importance.
- The first class of students enrolled in our new Master of Science in Photonic Communications Engineering degree program, targeting industry impact and entrepreneurship.
- 48 invention disclosures, 14 patents issued, 14 license/option agreements, two start-up companies.
- 60 scientific conference presentations or journal publications.



*Amit Ashok, Ph.D.,
Assistant Professor,
Optical Sciences*

“TRIF funding has been invaluable in establishing the Intelligent Imaging and Sensing Lab (I²SL), where we’re demonstrating a revolutionary new generation of computational optical imagers and sensors. This has already led to \$525K of sponsored research funding, and the high performance computing cluster that is critical to this work was made possible with TRIF funds.”



WATER, ENVIRONMENTAL, and ENERGY SOLUTIONS (WEES)

The Water, Environmental, and Energy Solutions (WEES) initiative is developing innovative, practical solutions necessary for water, environmental, and energy sustainability in Arizona and other semi-arid regions facing increasing demands on natural resources and the uncertainties of climate variability. WEES projects help to secure adequate supplies of clean water for Arizona's economic vitality and the health of its residents, provide a foundation of knowledge to optimize sustainable use of Arizona's lands, create an Arizona that is resilient in the face of climate variability, and lead the creation of a vibrant renewable energy industry in the state.



In partnership with the U.S. Bureau of Reclamation, Dr. Wendell Ela (above), professor of chemical and environmental engineering, and Ardeth Barnhart, program director of the Renewable Energy Network, are collaborating on a study of water quality on the Navajo Nation in Arizona and the feasibility of developing and deploying a pilot-scale solar-driven desalination system that could be sustainably supported by local residents. This low-cost system for water treatment has tremendous potential to provide safe drinking water in remote areas around the world.

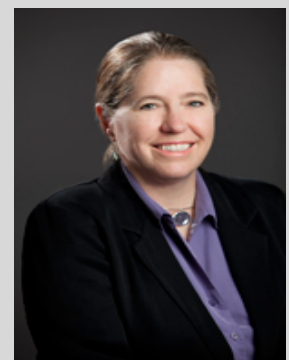
Goals

- Build on the UA's world-renowned expertise in water and climate variability and its emerging excellence in the renewable energy sector, to enhance multi-disciplinary collaboration for science, technology, and policy studies.
- Focus on use-inspired research performed by multi-disciplinary teams that will result in innovative, practical solutions.
- Leverage investment in strategic areas to increase public and private sector funding and increase the rate of technology transfer and commercial development.
- Train a new generation of scientists, engineers, and other professionals.



Student Natalie Brassill samples irrigation water in Yuma.

Dr. Jean McLain, recently hired as associate director of the Water Resources Research Center and research scientist in the soil, water, and environmental science department, spearheads the UA Food Safety Consortium. Addressing an area of critical concern to the public and industry, a broad coalition of experts is securing external funding for food and water safety research to support agricultural industries that contributed more than \$731 billion to the Arizona economy in 2011.





Summary of Accomplishments

WEES supported nine new faculty hires in departments ranging from economics to American Indian studies and soil, water, and environmental science to enhance UA's strengths in environmental science, engineering, and policy. In addition, WEES funded 14 interdisciplinary research projects and nine instrumentation grants, leveraging external funding aimed at resolving issues related to Arizona's agriculture, water supply and quality, and sustainable energy needs. Research and training opportunities were provided to 321 graduate students, 122 undergraduate students, and 87 postdoctoral researchers. WEES sponsored or co-sponsored 83 campus and community activities and events.

Collectively, WEES investments in faculty and projects resulted in \$30M in new grants and gifts to the UA. In addition, 19 new inventions were disclosed, two patents were issued, and one startup company was created.



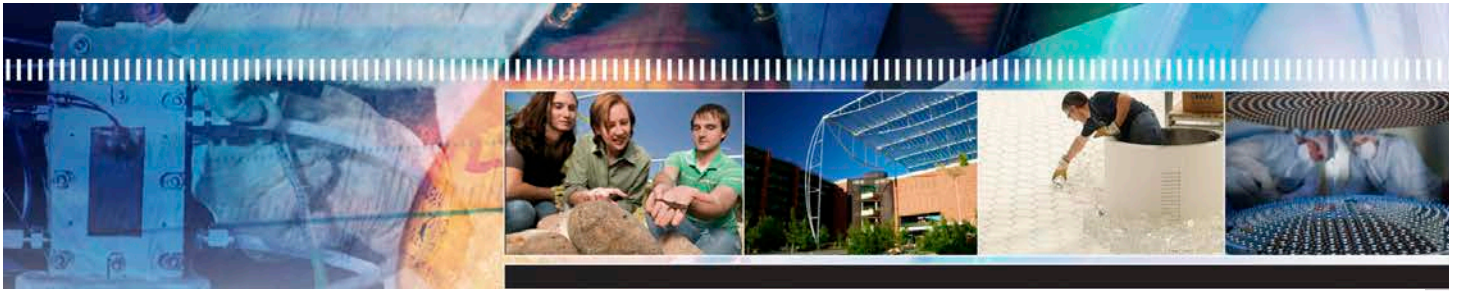
The Water Investigations Program (WIP) led by Arizona Project WET (Water Education for Teachers) in collaboration with The Nature Conservancy reached 1,800 middle school students in the Phoenix Valley. Students connect urban water use and natural river and riparian systems through hands-on learning experiences, while developing critical thinking skills and understanding of STEM content.

Results – Impact

- The UA-hosted International Conference on Climate Adaptation convened more than 600 researchers, policy makers, and practitioners from 65 countries to focus on the challenges and opportunities of adapting to climate variability and reducing disaster risks. The conference generated connections and funding that positioned UA as a leader in adaptation expertise.
- The Center for Environmentally Sustainable Mining was created to bring together mining industries and UA researchers and support the transfer of new technologies and strategies developed at UA for this important economic driver.
- The UA Arizona Laboratory for Emerging Contaminants was cited by the Good Housekeeping Research Institute as "one of the world's leading labs for study of unregulated chemicals."
- Among several partnerships with ASU, UA's Water Resources Research Center and ASU's Morrison Institute hosted a statewide conference on water in the sun corridor, drawing 342 registrants from 39 Arizona communities plus eight other states. In addition, the Arizona Energy and Environmental Policy Workshop convened 45 researchers from ASU, UA, and other universities.



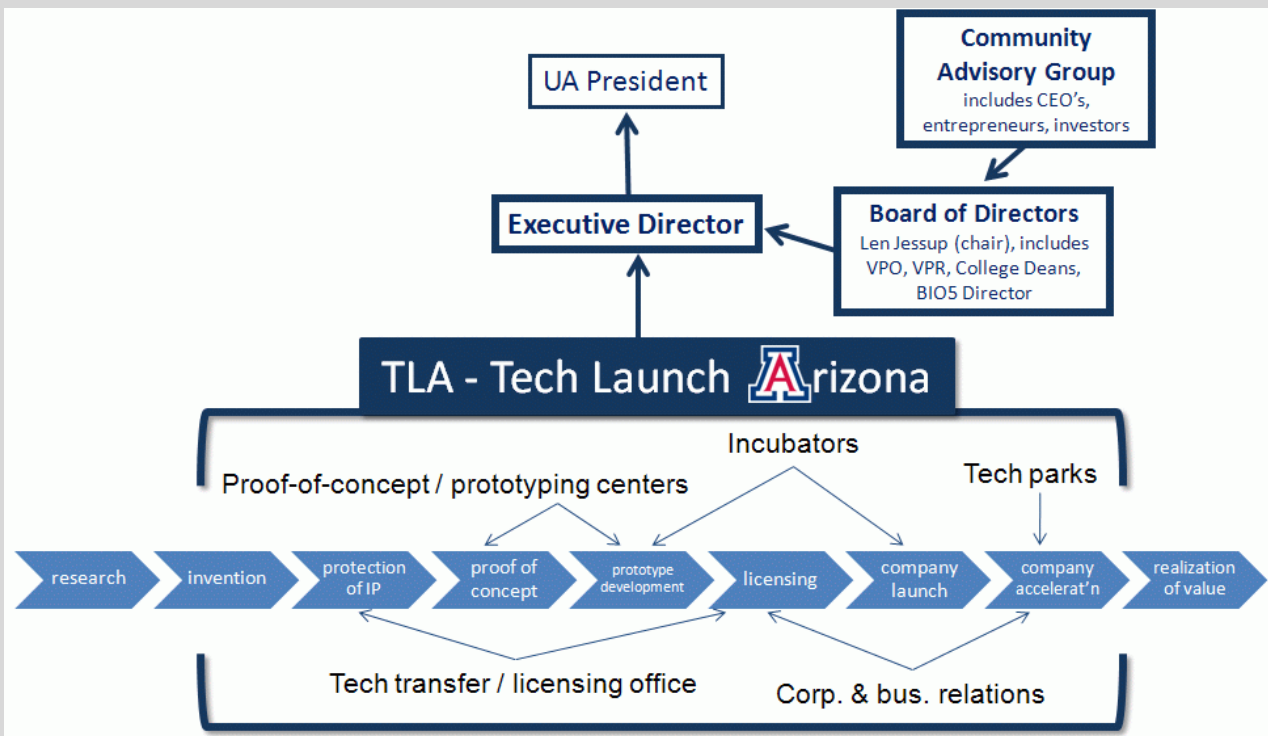
Dr. Kim Ogden, professor of chemical and environmental engineering, is the engineering lead of a national consortium to bring sustainable and economically sound algae-based biofuels to market funded through a U.S. Department of Energy grant totaling more than \$44M.



TECH LAUNCH ARIZONA (TLA)

Contributing to the economic development of southern Arizona by generating new companies remains a major goal of the University of Arizona. In spring 2012, UA announced Tech Launch Arizona, an exciting new initiative designed to make dramatic progress in this effort. The strong entrepreneurial culture of the University has led to substantial increases in many of our economic development measures, even in a highly unfavorable economy. TLA will expand on this success.

TLA will integrate the University of Arizona’s various private sector-facing technology units—the Office of Technology Transfer, Office of Business and Corporate Relations, Arizona Center for Innovation, and Research Parks—and closely coordinate with our McGuire Center for Entrepreneurship. In doing so, TLA will create value via expanded and coordinated strategies and services. TLA will better capitalize on existing efforts by more efficiently moving research to the marketplace through both licensing and the incubation of startup companies. This approach will coordinate the entire commercialization continuum, from identification of high value research projects, through intellectual property protection and prototype development, to company launch, incubation, and acceleration.



Schematic diagram of TLA commercialization continuum and institutional organization. The flow from research and development to commercialization (left to right) illustrates the coordinated and integrated roles of the offices being unified within TLA. The upper part of the diagram shows the high-level oversight and advisory structure for TLA.



Goals

- Create an environment that facilitates the rapid formation of startups based on UA research and intellectual property, with a seamless laboratory-to-incubator continuum.
- Engage faculty researchers in a way that encourages participation in the commercialization process.
- Provide a business-friendly interface between the UA and the private sector to effectively connect the research enterprise with external businesses, entrepreneurs, and investors.
- Provide support to faculty researchers in commercialization efforts in the form of tools, training, and assistance.
- Offer meaningful opportunities for science and entrepreneurship students wanting to gain experience in startup formation.
- Grow the University's return on its efforts through enhanced reputation, greater economic development impact in Arizona, increased industry-sponsored research partnerships, and increased licensing revenues.

Summary of Accomplishments

Because TLA is in its formative stages, its list of achievements is transitional. A number of technology transfer activities are ongoing, based on the existing offices at the University that are being combined into TLA. Selected details are presented below. TLA inherits a solid baseline performance of invention disclosures and startup companies and will build on them to create more commercial success and licensing revenue.

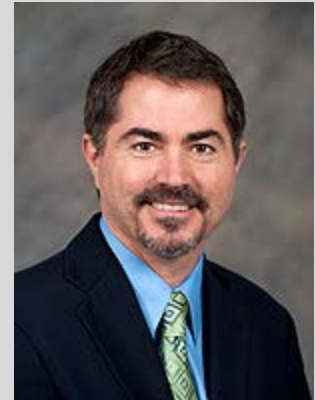
TLA's Executive Director will report directly to the University's President, thus giving TLA unprecedented integration with the upper administration.

In addition to setting the goals and future direction of TLA and its various sub-units, the Executive Director will be responsible for strengthening TLA's ties with the corporate, venture, and angel investor communities inside and outside Arizona. Oversight is provided by the University President, a Board of Directors, a Community Advisory Group, and the Arizona Board of Regents.

Results – Impact

For fiscal year 2012, some key University-wide technology transfer achievements were as follows:

- 142 invention disclosures.
- 47 licenses and options, 18 of them to Arizona companies.
- 131 patent applications.
- Six startup companies, of which four are in Arizona.
- 2.77 return on investment (ROI), based on license income relative to TRIF investment.



Leonard Jessup, Ph.D., Dean of the Eller College of Management

Jessup is the inaugural Chair of the TLA Board of Directors and is leading the search for the Executive Director of TLA.

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innovation

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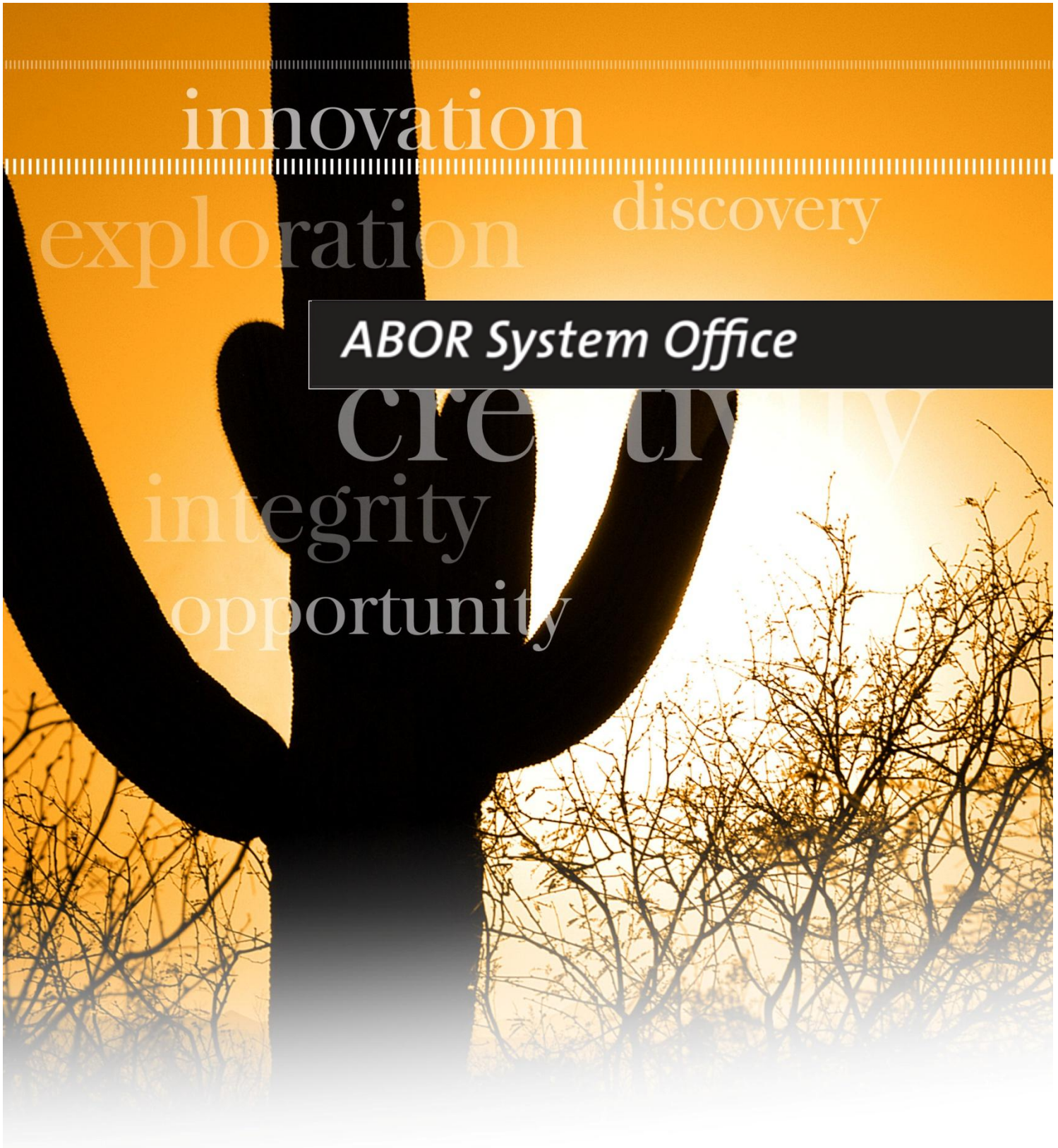
discovery

ABOR System Office

CREATIVITY

integrity

opportunity





The Regents Innovation Fund has been instrumental in supporting the research activities of the universities, and contributing toward collaborative efforts among the universities and with community partners.

In FY 2012, the Regents Innovation Fund was used to support work in 3 areas the Center for the Future of Arizona, the National Student Clearinghouse, and a Clinical and Translational Science Award (CTSA). The

NATIONAL STUDENT CLEARINGHOUSE

The Clearinghouse provides a nationwide, central repository of information on the enrollment status and educational achievements of postsecondary students. Participating educational institutions submit to the Clearinghouse information on the enrollment statuses of all of their students and listings of the alumni to whom they have awarded degrees or certificates.

As part of a multi-year agreement, ABOR is able to access the Clearinghouse data provided back to the Arizona Department of Education. This information is used in analyzing and reporting the postsecondary activity of our high school graduates as relevant to the Enterprise Model goals and economic development objectives of the state of Arizona.

HEALTH RESEARCH ALLIANCE ARIZONA/CLINICAL AND TRANSLATIONAL SCIENCE AWARD (HRAA/CTSA)

The TRIF funding for this initiative, to build the infrastructure to secure a CTSA, has been processed by the University of Arizona and will be reflected in their reporting.

INFORMATION TECHNOLOGY COLLABORATIVE

The final payments on this initiative were disbursed in FY 2012.



CENTER FOR THE FUTURE OF ARIZONA (CFA)

The citizens' agenda captured by the Gallup Arizona Poll / *The Arizona We Want* calls for a competitively educated workforce, with particular emphasis on high school students being college-career ready by graduation as measured by national and international standards. With the support of TRIF funding, all Center initiatives are making substantial progress in helping Arizona achieve this key objective.

Goals:

Beat the Odds – Increase “achievement per student” in low-income, Latino-intensive schools by working with principals to embed the “six keys to success” identified by CFA research in the school’s culture.

FY 2012: Expand program in both urban and rural areas of the state.

- Make updates to online resource center and support services available to rural and tribal schools.
- Expand online training modules to include assistant and aspiring principals.
- Develop online Alumni Network for principals who have completed the three-year training cycle.

Move On When Ready – Prepare all high school students to be college-career ready by implementing a performance-based education model that increases academic achievement to national and international levels.

FY2012: Establish a Learning Collaborative to support both advocacy and implementation.

- Create a digital learning management system to support schools in the Learning Collaborative.
- Facilitate communication and collaboration across all schools participating in the initiative.
- Participate in and positively influence education policy planning and decision-making at all levels.

The Arizona We Want – Establish the public-private partnerships needed to achieve all citizen goals starting with education.

FY2012: Implement a two-tiered strategy.

- **STATEWIDE:** Work with a coalition of leading organizations to develop a scorecard with specific indicators that measure progress toward key education goals.
- **LOCAL:** Challenge communities to develop their own plans for achieving citizen goals and support local initiatives that connect citizens to local government and to one another.



MOVE ON WHEN READY: This initiative is changing the education paradigm in our state. We are moving from an education system based on time to one based on performance and mastery of learning. It makes the education system more flexible, and opens doors closed to many students today by ensuring every student is on a path to be successful in college, career, and life.

Antonia Badone,
Superintendent of Yuma Union High School District, a *Move On When Ready* partner district



Summary of Accomplishments:

The synergy created by the three programs makes it possible for CFA to align and advance key educational goals at all levels, from policy makers and practitioners to the community at large. Working with a coalition of leading organizations, a set of indicators has been developed for the education scorecard that include reading by 3rd grade, adoption of Arizona Common Core Standards, a commitment to graduating high school students who are college-career ready and increasing participation in and completion of post-secondary education. *Beat the Odds* and *Move On When Ready* are making significant contributions to moving Arizona forward on all four indicators. So are Arizona communities. Of the 96 proposals submitted to the 5 Communities Project, 51 focus on strengthening education with 14 emphasizing the need to grow STEM education in local schools. The importance of TRIF funding cannot be overstated. It provides the technological capacity necessary for the Center to manage hundreds of relationships with leaders and engage thousands of citizens in advancing their key goals for Arizona’s future.

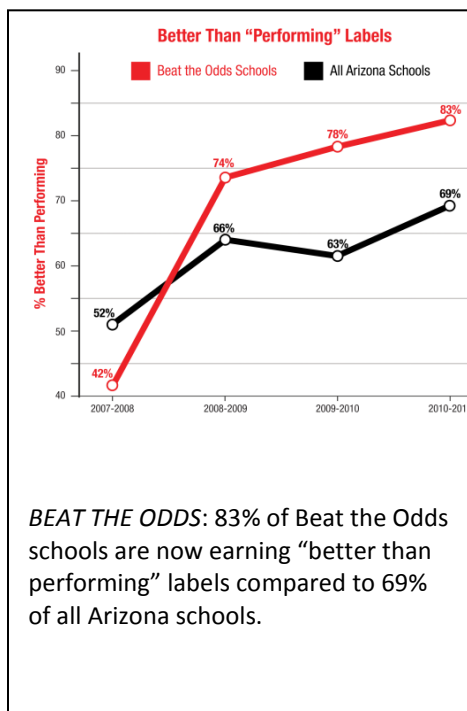
Results – Impact:

Beat the Odds – Over the last five years, BTO has been implemented in 143 schools. The focus on school principals is paying off – 83% of Beat the Odds schools are now earning “better than performing” labels compared to 69% for all Arizona schools.

Move on When Ready – CFA was instrumental in establishing the legislation and policies needed to implement the initiative.

Currently, the Center is working with 30 high schools statewide. A key focus going forward will be using digital adaptive technologies as tools for differentiated instruction.

The Arizona We Want – The scorecard project has involved more than 100 expert participants to date. More than 10,000 Arizonans have taken the Gallup Arizona Poll online. The 96 communities participating in the 5 Communities Project include nearly 500 Arizona partner organizations with members, employees and/or students numbering in the hundreds of thousands.



Return on Investment:

Every \$1 of TRIF funding invested in CFA programs is matched by \$6.70 from other private and public sources.

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discovery

System Summary: TRIF Metrics and Financials

innovation

exploration

opportunity

creativity

integrity

**ARIZONA UNIVERSITY SYSTEM
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
FY 2012-2016**

	<i>FY 2012 ACTUAL</i>	<i>FY 2012 BUDGET</i>	<i>FY 2013 BUDGET</i>	<i>FY 2014 BUDGET</i>	<i>FY 2015 BUDGET</i>	<i>FY 2016 BUDGET</i>
REVENUE						
Carryforward	\$ 3,142,709	\$ 2,053,748	\$ 7,354,128	\$ -	\$ -	\$ -
TRIF Revenue	57,054,818	53,999,980	56,999,080	56,989,180	55,483,780	55,487,280
TOTAL REVENUE	\$ 60,197,527	\$ 56,053,728	\$ 64,353,208	\$ 56,989,180	\$ 55,483,780	\$ 55,487,280
EXPENDITURES						
OPERATING						
Personal Services	\$ 19,115,118	\$ 19,220,421	\$ 22,999,805	\$ 20,623,722	\$ 20,426,999	\$ 20,528,084
ERE	6,422,325	6,868,549	8,431,499	7,287,133	7,218,304	7,258,129
All Other Operating	14,636,828	14,496,911	15,275,664	13,965,010	13,500,563	12,709,653
Grants/Projects						-
TOTAL OPERATING	40,174,270	40,585,880	46,706,968	41,875,865	41,145,865	40,495,866
CAPITAL						
Building Renovation	400,000	2,772,300	4,134,300	4,134,300	3,864,300	4,014,300
Debt Service	6,430,990	5,449,754	5,565,040	5,519,615	5,519,615	5,519,615
ASU Polytechnic/West COPS	3,716,100	3,720,200	3,719,300	3,709,400	3,704,000	3,707,500
AZUN	500,000	500,000	500,000	500,000	500,000	500,000
Regents Innovation Fund	659,993	800,000	2,315,554	250,000	250,000	250,000
Equipment Acquisition	962,046	962,046	1,412,046	1,000,000	500,000	1,000,000
TOTAL CAPITAL	12,669,129	14,204,300	17,646,240	15,113,315	14,337,915	14,991,415
EXPENDITURES TOTAL	\$ 52,843,399	\$ 54,790,180	\$ 64,353,207	\$ 56,989,180	\$ 55,483,780	\$ 55,487,281
SUMMARY BY PROGRAM AREA						
Access/Workforce Development	6,602,968	5,734,760	8,587,236	7,230,823	7,012,280	7,012,280
Improving Health	24,823,369	25,371,320	28,042,332	24,417,760	23,405,941	23,791,600
National Security Systems Initiative	1,628,600	2,100,000	1,970,000	2,500,000	3,500,000	3,500,000
Space Exploration and Optical Solutions	3,905,879	4,254,000	5,011,721	4,517,959	4,369,553	4,396,840
Water, Environment and Energy Solutions	8,983,949	10,079,900	11,093,460	10,690,189	9,528,516	9,086,569
UARC: Tech Launch Arizona	1,334,442	1,430,000	2,263,605	2,323,049	2,363,490	2,392,491
Regents Innovation Fund	659,993	1,000,000	2,565,554	500,000	500,000	500,000
ASU Polytechnic COPS	2,082,600	2,086,600	2,082,100	2,077,300	2,076,400	2,077,700
ASU West COPS	1,633,500	1,633,600	1,637,200	1,632,100	1,627,600	1,629,800
AZUN	1,069,734	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000
PROGRAM AREA TOTAL	52,725,033	54,790,180	64,353,208	56,989,180	55,483,780	55,487,280
EXPENDITURES TOTAL	\$ 52,725,033	\$ 54,790,180	\$ 64,353,208	\$ 56,989,180	\$ 55,483,780	\$ 55,487,280

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innovation discovery
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ASU

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ARIZONA STATE UNIVERSITY

**ARIZONA STATE UNIVERSITY
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
FY 2012 - 2016**

	FY 2012 ACTUAL	FY 2012 BUDGET	FY 2013 BUDGET	FY 2014 BUDGET	FY 2015 BUDGET	FY 2016 BUDGET
REVENUE						
Carryforward	\$ 790,200	\$ 790,200	\$ 1,688,200	\$ -	\$ -	\$ -
TRIF Revenue	23,748,000	22,992,100	24,391,200	24,381,300	23,775,900	23,779,400
TOTAL REVENUE	\$ 24,538,200	\$ 23,782,300	\$ 26,079,400	\$ 24,381,300	\$ 23,775,900	\$ 23,779,400
EXPENDITURES						
OPERATING						
Personal Services	\$ 7,684,500	\$ 6,238,500	\$ 7,855,100	\$ 7,094,100	\$ 6,877,700	\$ 6,877,700
ERE	2,883,800	2,423,300	2,947,800	2,662,300	2,581,100	2,581,100
All Other Operating	6,479,000	7,628,000	6,622,900	5,981,200	5,798,800	5,798,800
TOTAL OPERATING	17,047,300	16,289,800	17,425,800	15,737,600	15,257,600	15,257,600
CAPITAL						
Building Renovation	-	2,772,300	3,934,300	3,934,300	3,814,300	3,814,300
Debt Service	2,086,600	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
ASU Poly/ASU West COPS	3,716,100	3,720,200	3,719,300	3,709,400	3,704,000	3,707,500
TOTAL CAPITAL	5,802,700	7,492,500	8,653,600	8,643,700	8,518,300	8,521,800
TOTAL EXPENDITURES	\$ 22,850,000	\$ 23,782,300	\$ 26,079,400	\$ 24,381,300	\$ 23,775,900	\$ 23,779,400
SUMMARY BY INITIATIVE						
National Security Systems Initiative	\$ 1,628,600	\$ 2,100,000	\$ 1,970,000	\$ 2,500,000	\$ 3,500,000	\$ 3,500,000
Improving Health	13,974,400	14,000,100	16,479,500	13,671,900	13,071,900	13,571,900
Water, Environ and Energy Solutions	3,530,900	3,962,000	3,910,600	4,500,000	3,500,000	3,000,000
ASU Polytechnic COPS	2,082,600	2,086,600	2,082,100	2,077,300	2,076,400	2,077,700
ASU West COPS	1,633,500	1,633,600	1,637,200	1,632,100	1,627,600	1,629,800
TOTAL EXPENDITURES	\$ 22,850,000	\$ 23,782,300	\$ 26,079,400	\$ 24,381,300	\$ 23,775,900	\$ 23,779,400

ARIZONA STATE UNIVERSITY
 IMPROVING HEALTH FOCUS AREA

PERFORMANCE ANALYSIS	Actual FY 12	Budget FY 12	Budget FY 13	Budget FY 14	Budget FY 15	Budget FY 16
TRIF EXPENDITURES						
Total	13,974,400	14,000,100	16,479,500	13,671,900	13,071,900	13,571,900
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards	54,537,411	55,000,000	67,000,000	75,000,000	85,000,000	98,000,000
Gifts & Other Sources	40,505	40,000	40,000	40,000	40,000	40,000
Royalty Income	821,889	800,000	800,000	800,000	800,000	800,000
TOTAL	55,399,805	55,840,000	67,840,000	75,840,000	85,840,000	98,840,000
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	45	65	75	80	85	95
US Patents Issued	0	4	4	5	6	6
Licenses and Options Executed	13	12	13	15	17	18
Startup Companies	2	1	1	1	1	1
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	38	35	60	95	135	175
Graduate Students	111	110	110	110	110	110
Undergraduate Students	73	73	70	70	70	70

ARIZONA STATE UNIVERSITY
 NATIONAL SECURITY SYSTEMS FOCUS AREA

PERFORMANCE ANALYSIS	Actual FY 12	Budget FY 12	Budget FY 13	Budget FY 14	Budget FY 15	Budget FY 16
TRIF EXPENDITURES						
Total	1,628,600	2,100,000	1,970,000	2,500,000	3,500,000	3,500,000
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards	12,618,000	12,000,000	15,000,000	33,000,000	45,000,000	70,000,000
Gifts & Other Sources	0	0	10,000	10,000	10,000	10,000
Royalty Income	128,250	120,000	250,000	350,000	555,000	725,000
TOTAL	12,746,250	12,120,000	15,260,000	33,360,000	45,565,000	70,735,000
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	9	10	15	20	25	30
US Patents Issued	0	0	1	1	1	2
Licenses and Options Executed	2	2	3	3	3	4
Startup Companies	0	0	0	0	0	0
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	0	5	12	15	23	25
Graduate Students	17	20	20	20	20	20
Undergraduate Students	0	5	5	5	5	5

ARIZONA STATE UNIVERSITY

WATER, ENVIRONMENT AND ENERGY SOLUTIONS FOCUS AREA

PERFORMANCE ANALYSIS	Actual FY 12	Budget FY 12	Budget FY 13	Budget FY 14	Budget FY 15	Budget FY 16
TRIF EXPENDITURES						
Total	3,530,900	3,962,000	3,910,600	4,500,000	3,500,000	3,000,000
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards	12,122,712	10,000,000	14,000,000	14,000,000	17,000,000	17,000,000
Gifts & Other Sources	0	0	25,000	25,000	25,000	25,000
Royalty Income	252,018	250,000	290,000	375,000	475,000	610,000
TOTAL	12,374,730	10,250,000	14,315,000	14,400,000	17,500,000	17,635,000
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	0	8	9	10	11	12
US Patents Issued	1	2	2	3	4	4
Licenses and Options Executed	3	6	6	9	12	12
Startup Companies	0	0	1	0	0	1
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	7	10	15	15	20	20
Graduate Students	36	35	35	35	35	35
Undergraduate Students	13	15	15	15	15	15



innovation

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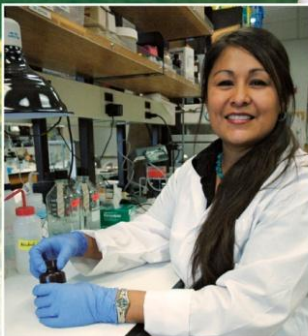
discovery

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creativity

integrity

opportunity



**NORTHERN ARIZONA
UNIVERSITY**

**NORTHERN ARIZONA UNIVERSITY
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
FY 2012 - 2016**

	<i>FY 2012 ACTUAL</i>	<i>FY 2012 BUDGET</i>	<i>FY 2013 BUDGET</i>	<i>FY 2014 BUDGET</i>	<i>FY 2015 BUDGET</i>	<i>FY 2016 BUDGET</i>
REVENUE						
Carryforward	\$ 1,630,638	\$ 541,677	\$ 2,211,881	\$ -	\$ -	\$ -
TRIF Revenue	11,157,019	10,735,960	11,435,960	11,435,960	11,135,960	11,135,960
TOTAL REVENUE	\$ 12,787,657	\$ 11,277,637	\$ 13,647,841	\$ 11,435,960	\$ 11,135,960	\$ 11,135,960
EXPENDITURES						
OPERATING						
Personal Services	\$ 4,630,588	\$ 4,443,345	\$ 4,737,362	\$ 4,737,362	\$ 4,611,355	\$ 4,611,355
ERE	1,497,041	1,514,833	1,613,690	1,613,690	1,571,323	1,571,323
All Other Operating	1,641,711	1,865,983	3,619,703	1,865,293	2,383,668	1,733,668
TOTAL OPERATING	7,769,340	7,824,160	9,970,755	8,216,345	8,566,345	7,916,346
CAPITAL						
Building Renovation	-	-	200,000	200,000	50,000	200,000
Debt Service	1,344,390	1,449,754	1,565,040	1,519,615	1,519,615	1,519,615
Equipment Acquisition	962,046	962,046	1,412,046	1,000,000	500,000	1,000,000
AZUN	500,000	500,000	500,000	500,000	500,000	500,000
TOTAL CAPITAL	2,806,436	2,911,800	3,677,086	3,219,615	2,569,615	3,219,615
TOTAL EXPENDITURES	\$ 10,575,776	\$ 10,735,960	\$ 13,647,841	\$ 11,435,960	\$ 11,135,960	\$ 11,135,961
SUMMARY BY INITIATIVE						
Access/Workforce Development	\$ 6,602,968	\$ 5,734,760	\$ 8,587,236	\$ 7,230,823	\$ 7,012,280	\$ 7,012,280
AZUN	1,069,734	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000
Improving Health	1,253,436	1,950,600	1,710,037	1,340,679	1,305,509	1,305,509
Water, Energy, Environmental Solutions	1,649,638	1,950,600	2,250,568	1,764,458	1,718,171	1,718,171
TOTAL EXPENDITURES	\$ 10,575,776	\$ 10,735,960	\$ 13,647,841	\$ 11,435,960	\$ 11,135,960	\$ 11,135,960

NORTHERN ARIZONA UNIVERSITY
 WEES and IMPROVING HEALTH

PERFORMANCE ANALYSIS	Actual FY 12	Projected FY 12	Projected FY 13	Projected FY 14	Projected FY 15	Projected FY 16
TRIF EXPENDITURES						
Total	10,575,775	10,735,960	14,068,901	11,857,019	11,557,019	11,557,019
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards	14,105,945	14,105,945	14,670,183	15,256,990	15,867,270	16,501,961
Gifts & Other Sources	1,500,000	1,500,000	25,000	40,000	50,000	50,000
Intellectual Property Income	22,276	20,000	20,500	21,100	22,000	23,100
TOTAL	15,628,221	15,625,945	14,715,683	15,318,090	15,939,270	16,575,061
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	17	15	18	21	24	25
US Patents Issued	1	1	1	2	3	3
Licenses and Options Executed	1	1	3	4	4	5
Startup Companies	1	1	1	2	2	1
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	11	11	12	15	15	18
Graduate Students	92	92	100	120	125	130
Undergraduate Students	200	200	220	240	250	250

NORTHERN ARIZONA UNIVERSITY

ACCESS/WORKFORCE DEVELOPMENT/E-LEARNING

PERFORMANCE MEASURE	Actual FY 12	Projected FY 12	Projected FY 13	Projected FY 14	Projected FY 15	Projected FY 16
RETURN ON INVESTMENT (ROI)						
Annual impact of Graduates on Economy ¹	\$10.4M	\$10.4M	\$11.3 M	\$12.4 M	\$13.5 M	\$14.7 M
TECHNOLOGY TRANSFER/CURRICULUM INNOVATIONS						
Web/Hybrid/Enhanced Courses Developed ²	141	90	125	155	180	200
Faculty Developing Courses ³	265	200	225	250	300	350
Increase in Student Technology Literacy ⁴	4,122	3,100	3,300	3,800	4,000	4,200
Degree/Certificate Programs Offered ⁵	49	41	43	46	49	52
INDUSTRY OUTREACH						
Business/Nonprofit Collaborations ^{6,7}	203	100	110	125	140	155
WORKFORCE CONTRIBUTIONS						
Number of Student Served by A/W/D ⁸	3,772	3,099	3,377	3,681	4,013	4,374
PARTNERSHIPS/COLLABORATIONS						
Community College/NAU Students ⁹	3,077	3,669	3,999	4,359	4,751	5,179
Community College to NAU Programs ^{9,a,b}	71	91	93	95	97	99

¹ Estimated based on U.S. Census Bureau Data for annual increase in earnings by a baccalaureate-trained worker compared to high school degree starting in FY12 in millions \$.

² Includes Web, hybrid, IT-enhanced, redesigns and quality review process compliance.

³ The number of faculty participating in course development, design and redesign.

⁴ Number of students completing a course with significant or advanced technical fluency skills.

⁵ Number of degrees supported by TRIF A/WD funding.

⁶ Organizations (business, industry, nonprofits, school districts) with formal or informal relationships with Northern Arizona University related to TRIF A/WD activities.

⁷ Reporting based on number of students eligible to enroll in programs supported by A/WD funding.

⁸ Number of new students participating in the Northern Arizona University joint admissions or who transfer from a community college to NAU.

⁹ Program paths for a student to seamlessly transition from a given community college to NAU.

^a Variance between projected and actual number of collaborations reflects an increased focus on outreach and recruitment efforts.

^b Variance between projected and actual programs due to the recategorization of Bachelor of Arts in Liberal Studies (BAILS) degrees to Bachelors of Interdisciplinary Studies (BIS) degrees.

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innovation

exploration

discovery

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creativity

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THE UNIVERSITY OF ARIZONA
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
FY 2012 - 2016

	<i>FY 2012 ACTUAL</i>	<i>FY 2012 BUDGET</i>	<i>FY 2013 BUDGET</i>	<i>FY 2014 BUDGET</i>	<i>FY 2015 BUDGET</i>	<i>FY 2016 BUDGET</i>
REVENUE						
Carryforward	\$ -	\$ -	\$ 1,388,493	\$ -	\$ -	\$ -
TRIF Revenue	20,027,757	19,271,920	20,671,920	20,671,920	20,071,920	20,071,920
TOTAL REVENUE	\$ 20,027,757	\$ 19,271,920	\$ 22,060,413	\$ 20,671,920	\$ 20,071,920	\$ 20,071,920
EXPENDITURES						
OPERATING						
Personal Services	\$ 6,711,059	\$ 8,438,576	\$ 10,276,043	\$ 8,660,960	\$ 8,806,644	\$ 8,907,729
ERE	2,013,928	2,905,416	3,830,609	2,971,743	3,026,481	3,066,306
All Other Operating	6,514,277	4,927,928	4,953,761	6,039,217	5,238,795	5,097,885
TOTAL OPERATING	15,239,264	16,271,920	19,060,413	17,671,920	17,071,920	17,071,920
CAPITAL						
Building Renovation	400,000					
Debt Service	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
TOTAL CAPITAL	3,400,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000
TOTAL EXPENDITURES	\$ 18,639,264	\$ 19,271,920	\$ 22,060,413	\$ 20,671,920	\$ 20,071,920	\$ 20,071,920
SUMMARY BY INITIATIVE						
Improving Health	\$ 9,595,533	\$ 9,420,620	\$ 9,852,795	\$ 9,405,181	\$ 9,028,532	\$ 8,914,191
Space Exploration and Optical Solutions	3,905,879	4,254,000	5,011,721	4,517,959	4,369,553	4,396,840
Water, Environmental and Energy Solutions	3,803,411	4,167,300	4,932,292	4,425,731	4,310,345	4,368,398
UARC: Tech Launch Arizona	1,334,442	1,430,000	2,263,605	2,323,049	2,363,490	2,392,491
TOTAL EXPENDITURES	\$ 18,639,264	\$ 19,271,920	\$ 22,060,413	\$ 20,671,920	\$ 20,071,920	\$ 20,071,920

THE UNIVERSITY OF ARIZONA
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
IMPROVING HEALTH

PERFORMANCE ANALYSIS	Actual FY 12	Projected FY 12	Projected FY 13	Projected FY 14	Projected FY 15	Projected FY 16
TRIF EXPENDITURES						
Total	\$ 9,595,533	\$ 9,420,620	\$ 9,852,795	\$ 9,405,181	\$ 9,028,532	\$ 8,914,191
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards (\$M)	\$57.70	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00
Gifts & Other Sources (\$M)	\$0.60	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50
Royalty Income (\$M)	\$0.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TOTAL	\$58.40	\$54.50	\$54.50	\$54.50	\$54.50	\$54.50
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	15	28	29	32	32	32
US Patents Issued	2	0	0	1	0	1
Licenses and Options Executed	4	8	8	8	9	10
Startup Companies	0	0	1	0	1	0
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	80	135	135	135	135	135
Graduate Students	179	320	320	320	320	320
Undergraduate Students	209	320	320	320	320	320

THE UNIVERSITY OF ARIZONA

TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF) SPACE & OPTICAL SCIENCES

PERFORMANCE ANALYSIS	Actual FY 12	Projected FY 12	Projected FY 13	Projected FY 14	Projected FY 15	Projected FY 16
TRIF EXPENDITURES						
Total	\$ 3,905,879	\$ 4,254,000	\$ 5,011,721	\$ 4,517,959	\$ 4,369,553	\$ 4,396,840
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards (\$M)	\$49.40	\$36.00	\$45.00	\$52.00	\$57.00	\$65.00
Gifts & Other Sources (\$M)	\$0.20	\$0.35	\$0.45	\$0.70	\$0.85	\$1.00
Royalty Income (\$M)	\$0.19	\$0.19	\$0.19	\$0.19	\$0.20	\$0.20
TOTAL	\$49.79	\$36.54	\$45.64	\$52.89	\$58.05	\$66.20
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted	48	45	50	60	70	75
US Patents Issued	14	14	15	17	18	20
Licenses and Options Executed	14	14	15	18	19	21
Startup Companies	2	1	1	2	3	3
WORKFORCE CONTRIBUTION						
Postdoctoral Appointees	10	10	11	11	12	12
Graduate Students	34	34	35	35	36	37
Undergraduate Students	7	7	8	8	9	9

THE UNIVERSITY OF ARIZONA
 TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
 WATER, ENVIRONMENTAL, ENERGY SOLUTIONS (WEES)

PERFORMANCE ANALYSIS	Actual FY 12	Projected FY 12	Projected FY 13	Projected FY 14	Projected FY 15	Projected FY 16
TRIF EXPENDITURES						
Total	\$ 3,803,411	\$4,167,300	\$4,932,292	\$4,425,731	\$4,310,345	\$4,368,398
FINANCIAL IMPACT OF TRIF INVESTMENT						
Sponsored Awards (\$M)	\$26.40	\$21.80	\$21.80	\$21.80	\$22.50	\$23.10
Gifts & Other Sources (\$M)	\$3.43	\$3.30	\$3.40	\$3.50	\$3.60	\$3.80
Royalty Income (\$M)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.30	\$0.50
TOTAL	\$29.83	\$25.10	\$25.20	\$25.30	\$26.40	\$27.40
TECHNOLOGY TRANSFER ACTIVITY						
Invention Disclosures Transacted ²	19	10	10	10	10	10
US Patents Issued	2	2	2	2	2	3
Licenses and Options Executed ³	1	4	4	4	7	7
Startup Companies ⁴	1	0	1	0	1	1
WORKFORCE CONTRIBUTION⁵						
Postdoctoral Appointees	87	75	75	75	80	85
Graduate Students	321	250	250	250	260	270
Undergraduate Students	122	100	100	100	110	120

Notes:

¹ Actual and Projected not previously reported

² Actual and Projected not previously reported

³ Actual and Projected revised to Licenses and Options Executed from License and Option Applications

⁴ Actual and Projected figures not previously reported

⁵ Actual and Projected include TRIF supported and TRIF enabled numbers; previously only supported included

innovation

exploration

discovery

ABOR System Office

CREATIVITY

integrity

opportunity



**ABOR SYSTEM OFFICE
TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)
FY 2012 - 2016**

	FY 2012 ACTUAL	FY 2012 BUDGET	FY 2013 BUDGET	FY 2014 BUDGET	FY 2015 BUDGET	FY 2016 BUDGET
REVENUE						
Carryforward	\$ 721,871	\$ 721,871	\$ 2,065,554	\$ -	\$ -	\$ -
TRIF Revenue	2,122,042	1,000,000	500,000	500,000	500,000	500,000
TOTAL REVENUE	\$ 2,843,913	\$ 1,721,871	\$ 2,565,554	\$ 500,000	\$ 500,000	\$ 500,000
EXPENDITURES						
OPERATING						
Personal Services	\$ 88,971	\$ 100,000	\$ 131,300	\$ 131,300	\$ 131,300	\$ 131,300
ERE	27,555	25,000	39,400	39,400	39,400	39,400
All Other Operating	1,840	75,000	79,300	79,300	79,300	79,300
TOTAL OPERATING	118,366	200,000	250,000	250,000	250,000	250,000
GRANTS/PROJECTS						
Regents Innovation Fund	659,993	800,000	2,315,554	250,000	250,000	250,000
TOTAL GRANTS/PROJECTS	659,993	800,000	2,315,554	250,000	250,000	250,000
TOTAL EXPENDITURES	\$ 778,359	\$ 1,000,000	\$ 2,565,554	\$ 500,000	\$ 500,000	\$ 500,000
SUMMARY BY INITIATIVE						
Regents Innovation Fund:						
Center for the Future of Arizona	225,000	225,000	325,000			
HRAA/CTSA	325,000	325,000	-			
National Student Clearinghouse	49,302	50,000	50,000	50,000	50,000	50,000
Collaboration	-	200,000	200,000	200,000	200,000	200,000
SciVal			202,000			
Graduate Research Grants			230,000			
Other	60,691	200,000	1,308,554	-	-	
TOTAL EXPENDITURES	\$ 659,993	\$ 1,000,000	\$ 2,315,554	\$ 250,000	\$ 250,000	\$ 250,000

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