

TECHNOLOGY AND RESEARCH INITIATIVE FUND (TRIF)

BIORESEARCH PROGRAM

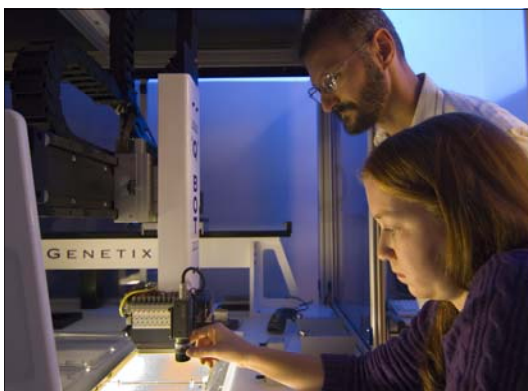


Arizona's First University.

September 1, 2009

TRIF UA Bioresearch Program faculty, students, and staff tackle complex and pressing problems of critical importance to Arizona and the nation. They do so by conducting leading edge interdisciplinary research and training initiatives, and putting in place crucial technology platforms and clinical trials infrastructure.

UA's TRIF-supported scientists are developing new ways to diagnose, treat and prevent disease; uncovering the biological basis of cognition and developing methods to reduce the negative impact of aging; and improving agriculture to better feed the world while maintaining livable environments. Through its research programs in bioengineering, drug discovery, genome structure and function, quantitative biology, and the neural basis for memory changes, scientists address cancer, diabetes, heart, neurological and respiratory diseases, cognition and aging. They develop new diagnostic tools; improve yield and nutritional quality of crops; and develop plants as sources of pharmaceuticals.



The UA Bioresearch Program is building the infrastructure to transfer research breakthroughs into applications that directly benefit society. A key aspect is the training of a new generation of clinical and translational scientists, who are bridging the gap between basic and clinical sciences and who will transform research discoveries into new medicines to treat patients and preserve health. This requires the creation of statewide structures for clinical and translational research, application of biomedical informatics

and enabling technologies, and financial support of teams of clinical and translational investigators. A second key aspect is moving discoveries to market through innovative programs and multiple partnerships with the private sector. A third key aspect is improving science education in K-12 and training the next generation of interdisciplinary scientists.

Fernando Martinez has overall responsibility for the TRIF UA Bioresearch Program, which supports three initiatives: the BIO5 Institute (directed by Fernando Martinez), the McKnight Brain Institute (directed by Carol Barnes) and ACTREC (Arizona Clinical and Translational Research and Education Consortium, directed by M. Peter Lance). Measures and goals are combined for all three initiatives.

Contents

Introduction	1
Performance Measures	2
Performance Analysis	2
Technology Transfer	2
Financial Information	3
Work Force Contribution	3
K-12 Science and Math	3
Educational Outreach	3
Goals	4
Management and Boards	4



Fernando D. Martinez, MD
Interim Director, BIO5 Institute
Regents' Professor

PERFORMANCE MEASURES

	FY 02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Proj	FY07 Actual	FY 08 Proj	FY 08 Actual	FY 09 Proj	FY09 Actual	FY10 Proj	FY11 Proj
RETURN ON INVESTMENT													
Sponsored Awards: (\$ in millions)	\$ 1.4	\$ 15.7	\$ 25.3	\$ 26.5	\$ 26.9	\$ 29.9	\$ 36.3	\$ 30.1	\$ 45.9	\$ 38.1	\$ 66.7	\$ 34.6	\$ 35.3
Federal Awards	\$ 1.4	\$ 15.6	\$ 25.1	\$ 26.2	\$ 26.5	\$ 28.9	\$ 35.3	\$ 27.1	\$ 37.8	\$ 33.1	\$ 59.9	\$ 31.6	\$ 31.8
Industrial Awards		\$ 0.1	\$ 0.2	\$ 0.3	\$ 0.4	\$ 1.0	\$ 1.0	\$ 1.5	\$ 0.6	\$ 2.5	\$ 0.6	\$ 1.0	\$ 1.5
Other Awards								\$ 1.5	\$ 7.5	\$ 2.5	\$ 6.2	\$ 2.0	\$ 2.0
Gifts & Other Sources					\$ 0.2	\$ 1.1	\$ 1.4	\$ 1.2	\$ 1.3	\$ 1.3	\$ 1.6	\$ 1.4	\$ 1.5
TECHNOLOGY TRANSFER & COLLABORATIONS													
Invention Disclosures ¹		57	46	65	30	22	30	24	23	27	26	28	28
Licenses & Options ¹		75	17	25	7	4	4	5	4	6	11	7	8
Patent Applications	1	37	63	50	37								
New Start-up Companies					1	1	1	0	0	2	3	0	2
WORKFORCE CONTRIBUTIONS													
Number of Graduate Students Enrolled		1,183	1,299	1,341	1,268								
Number of Undergraduate Degrees Awarded		658	705	733	1,014								
Number of Graduate Degrees Awarded		266	280	285	420								
Undergraduate Trainees					273	242	338	247	348	253	355	258	261
Graduate Trainees					290	254	300	266	380	280	347	293	318
Postdoctoral Trainees					137	154	148	146	161	150	156	151	158
New Faculty Hires	7	8	8	6	6	5	10	5	8	8	8	5	6
Clinical Scholars Circle Members						40	44	50	52	80	90	120	150
Number of Affiliate Clinical Partners in ACTREC						9	3	14	32	21	25	34	47
OUTREACH & EDUCATION													
Teachers/Educators Trained					220	113	289	200	730	200	750	200	200
K-12 Students Benefitting & Participating					35,082	9,175	45,342	30,000	40,007	30,000	42,036	30,000	30,000
Workshops, Seminars, & Conferences Supported	3	3	3	3	10	11	12	11	47	19	46	9	19

¹FY03 to FY06 activities include all UA Life Sciences; FY03 to FY09 and projections are Bioresearch activities only.

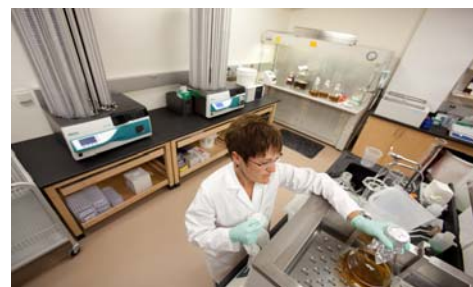
²Sponsored awards in FY09 reflect the multi-year federal award of the National Children’s Study (~\$16M)

PERFORMANCE ANALYSIS

The Bioresearch Program funds are significantly leveraged to improve Arizonans’ lives through conducting leading edge basic and applied research and training programs, moving discoveries to market and increasing the number of businesses in Arizona, preparing students for careers in science, technology and medicine, and improving K-12 science education.

RETURN ON INVESTMENT (ROI)

Achievements of faculty members who are or have been directly supported by TRIF are reported. Bioresearch Program faculty continue to be nationally competitive in garnering federal research dollars, in spite of very tight federal budgets. For example, outstanding faculty and the BIO5 Institute’s infrastructure led to a \$50 million NSF grant, (~\$15M received to date), to establish the iPlant Collaborative. The \$1 million match each year from McKnight Brain Research Foundation provides a firm base for the McKnight Brain Institute, and ACTREC continues to support both the CATS Research Center, which has grown from 11 to 50 research protocols, and the Health Research Alliance Arizona (HRAA), a collaboration among UA, ASU and NAU.



TECHNOLOGY TRANSFER AND INDUSTRY COLLABORATION

The commercialization of new products and processes and the expansion of the biotechnology industry is facilitated through interactions and collaborations among faculty, students, and industrial scientists and making our leading-edge facilities available to industry scientists. Researchers continue to generate substantial invention disclosures and licenses & options in the life sciences arena. This year, three new biotechnology companies based on UA faculty research have received ABOR approval. They are: BioVidria

FINANCIAL INFORMATION

	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Actual	FY08 Actual	FY09 Revised Budget	FY09 Actual	FY10 Revised Budget	FY11 Revised Budget
REVENUE											
Carry Forward	\$ -	\$ 2,761,724	\$ 365,463	\$1,764,660	\$ 2,521,226	\$ 2,586,804	\$ 3,352,595	\$ 1,605,691	\$ 1,605,691	\$ 356,613	\$ -
New TRIF Revenue	\$ 4,837,623	\$ 4,803,518	\$ 5,251,866	\$6,976,943	\$ 5,811,155	\$ 6,644,563	\$ 6,753,985	\$ 7,495,034	\$ 5,861,117	\$ 6,014,911	\$5,925,637
Regents Innovation Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500,000	\$ 500,000	\$ 500,000	\$ -	\$ -
TOTAL REVENUE	\$ 4,837,623	\$ 7,565,242	\$ 5,617,329	\$8,741,603	\$8,332,381	\$ 9,231,367	\$10,606,580	\$ 9,600,725	\$ 7,966,808	\$ 6,371,524	\$5,925,637
EXPENDITURES											
Personal Services	\$ 620,100	\$ 3,325,935	\$ 308,333	\$2,594,735	\$3,604,324	\$ 3,350,614	\$ 6,199,528	\$ 7,834,755	\$ 5,836,438	\$ 5,135,569	\$5,046,548
All Other Operating Expenses	\$ 1,195,799	\$ 3,713,844	\$ 1,544,336	\$1,475,642	\$2,353,434	\$ 2,359,151	\$ 3,107,163	\$ 1,265,970	\$ 1,150,634	\$ 1,235,955	\$ 879,089
Capital	\$ 260,000	\$ 160,000	\$ 2,000,000	\$2,150,000	\$1,687,819	\$ 169,007	\$ (316,028)	\$ -	\$ 5,120	\$ -	\$ -
Regents Innovation Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,226	\$ 500,000	\$ 618,003	\$ -	\$ -
TOTAL EXPENDITURES	\$ 2,075,899	\$ 7,199,779	\$ 3,852,669	\$6,220,377	\$7,645,577	\$ 5,878,772	\$ 9,000,889	\$ 9,600,725	\$ 7,610,195	\$6,371,524	\$5,925,637
Return on Investment	0.7:1	2.2:1	6.6:1	4.3:1	3.5:1	6.4:1	5.2:1	4.1:1	9.0:1	5.6:1	6.2:1

Notes:

- 1) Carry forward for FY07 consists of the following: Carry forward of \$686,804 from BIO5 Institute; Over-realized revenue of \$900,000 from McKnight Brain Institute; and Over-realized revenue of \$1,000,000 from Arizona Clinical and Translational Research.
- 2) TRIF Regents Innovation Fund for the HRAA CTSA statewide effort approved at the December 6–7, 2007 ABOR meeting.
- 3) Return on Investment (ROI) for FY 2007-2011 was calculated using a new methodology approved by Arizona Board of Regents in March 2007, which is different from the ROI methodology used to calculate ROI in FY 2002-2006.
- 4) Funding of the Arizona Board of Regents' Technology and Research Initiative Fund (TRIF) is provided by a 0.6 percent increase in the Arizona sales tax rate approved by the voters through Proposition 301 on the November 2000 general election ballot.

started by Mary Wirth to speed drug discovery and disease detection through coated microarrays; Lucoome Biotechnologies owned and run by Indraneel Ghosh using Kinase Seeker, a technology to speed the development of drugs to treat cancers and other diseases; and Cancer Prevention Pharmaceuticals, run by Eugene Gerner, that is currently conducting clinical trials on a drug combination that substantially reduces the recurrence of colon cancer. All three faculty are BIO5 members.

WORKFORCE CONTRIBUTIONS

A critical component of economic development is a workforce to meet the needs of Arizona's growing bioscience and health industries. Our workforce initiatives from high school through post-graduate are developed in response to industry needs and provide students with exciting experiences that enhance their learning and career opportunities. Our internships expose students to industry settings and community college, high school students and teachers to cutting-edge research at the university. New graduate programs are training the next generation of interdisciplinary researchers. The translational scholars program and clinical scholar's circle, bringing together basic research faculty mentors and clinical scholars, have been established.

K-12 SCIENCE AND MATH EDUCATION

To enhance K-12 science and math education, we provide teachers and students in schools all over Arizona access to UA science and math resources and opportunities to participate in hands-on research experiences. We lead workshops and symposia for teachers and provide in-classroom support to assist them in implementing new, exciting curricula that meet state standards. Our programs are externally reviewed and receive significant federal funding, reported under ROI.



EDUCATIONAL OUTREACH

National and international scientific meetings have been organized to bring together top investigators in the world. For example, in May 2009, BIO5 hosted RECOMB2009, the 13th International Conference on Computation Biology. UA investigators organized the first McKnight Social Event at the Society for Neuroscience Annual Meeting in Washington, DC to bring together neuroscientists from around the country who are interested in aging research. In March 2009, HRAA held its first annual conference on Advances in Translational Science, providing state-of-the-art information for both established researchers and those in training.

GOALS

- Conduct state-of-the-art interdisciplinary bioresearch and translate it into tangible human benefit.
- Foster collaborative research between UA faculty and researchers within other Arizona institutions.
- Develop leading-edge interdisciplinary education and training programs for undergraduate and graduate students.
- Promote a translational scholars program and a clinical scholar's circle, which brings together cross-disciplinary senior faculty mentors and clinician scholars in research collaborations.
- Improve K-12 science education by providing teachers and students hands-on experiences in 21st century biology.
- Facilitate interactions and collaborations between researchers and industry to foster the development of new companies in Arizona.
- Strengthen UA's clinical and translational research infrastructure, including core support for study design, data management and bioinformatics, contracts, and human subjects research (Institutional Review Board interface, patient management, long distance clinical collaboration, good clinical practice, and good laboratory practice).
- Enable a statewide clinical science and trial industry by facilitating the development of small businesses that will provide core services and management support to industrial and academic partners interested in performing clinical studies in Arizona.
- Organize conferences to promote collaborative research initiatives and education on the national and international level.



MANAGEMENT

BIO5 Director **Fernando Martinez** reports to Dr. Leslie Tolbert, Vice President for Research, Graduate Studies and Economic Development. Dr. Martinez has overall responsibility for the TRIF UA Bioresearch Program and directs BIO5; **Carol Barnes** directs the McKnight Brain Institute, and **M. Peter Lance** directs ACTREC.

BOARDS

The TRIF Bioresearch Program has a single oversight board consisting of three business leaders in the biotechnology industry, which reviews the reports from each initiative advisory board(s) with the appropriate expertise for evaluating the initiative.

The Oversight Board for the UA TRIF Bioresearch Program consists of **Robert Morrison**, Executive Director, Desert Angels; **Jack Dean**, PhD, Past President of U.S. Science and Medical Affairs, Sanofi-Aventis Pharmaceuticals; **Joseph Jasinski**, PhD, Program Director, IBM Health Care & Life Sciences.

BIO5's External Business Advisory Board includes 15 business leaders from the Tucson region, state and nation. The Science Advisory Board is composed of six nationally renowned scientists in the fields of research represented at BIO5. BIO5's internal advisory committees are made up of Deans and faculty leadership from the colleges that partner with BIO5.

McKnight Brain Institute's external review group is the four Trustees of the McKnight Brain Research Foundation. Its Scientific Advisory Board is composed of seven scientists with expertise and significant research interests in aging and memory.

The UA ACTREC Advisory Board is composed of the Provost and Vice President of Research of the UA, the Director of BIO5 and the Deans of the seven colleges that carry out biomedical research.

LEARN MORE

- Contact **Dr. Fernando Martinez**, Director, Bioresearch Program and Interim Director, BIO5, The University of Arizona, at fernando@arc.arizona.edu or 520-626-4272. Visit the BIO5 website at www.bio5.org
- Contact **Dr. Peter Lance**, Director, Arizona Clinical and Translational Research and Education Consortium, The University of Arizona, at plance@azcc.arizona.edu or 520-626-4492
- Contact **Dr. Carol Barnes**, Director, Evelyn F. McKnight Brain Institute, The University of Arizona, at carol@nsma.arizona.edu or 520-626-2312
- Contact **Dr. Leslie Tolbert**, Vice President for Research, Graduate Studies and Economic Development, The University of Arizona, at tolbert@email.arizona.edu or 520-621-3513

