

GROWING BIOTECHNOLOGY INITIATIVE (GBI)



NORTHERN ARIZONA UNIVERSITY

GROWING BIOTECHNOLOGY

September 1, 2009

The Growing Biotechnology Initiative (GBI) enables outstanding interdisciplinary research and development in biosciences, biotechnology, and bioengineering at Northern Arizona University (NAU) to be translated rapidly and effectively to address critical health, technology, and education issues essential for the Arizona New Economy.

GBI and its associated center SABRE (Strategic Alliance for Bioscience Research and Education) will continue its focus on research in new and emerging areas in the biosciences. Strengths include infectious diseases, medical instrumentation, forensic genetics, cancer, musculoskeletal and cardiopulmonary rehabilitation, endocrine systems, biomaterials, and respiratory failure. GBI is also expanding specific funding opportunities for product development based on previously funded research.

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Research areas supported by GBI and SABRE focus primarily on strategic initiatives identified in the 2007 Arizona Bioscience Roadmap, and specifically areas identified in the 2008 Northern Arizona Bioscience Roadmap. GBI's vision is to position Arizona as a global leader in the fast-growing biotechnology industry through research, technology transfer, business recruitment, and workforce development.

An emphasis on student participation at both undergraduate and graduate levels in research, combined with the high productivity of university researchers, gives NAU a unique position in Arizona to provide cutting-edge research while providing education and workforce development at all levels for the growing bioscience and biotechnology industries in the State of Arizona.



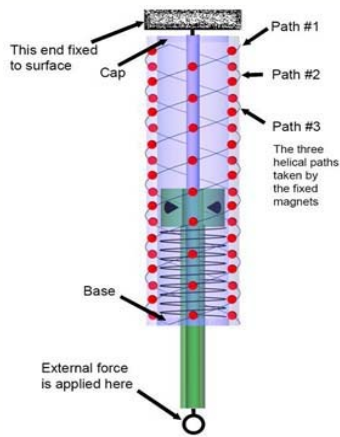
*Dr. Tim Porter, Director
Growing Biotechnology (GBI)*

PERFORMANCE ANALYSIS

METRICS (\$ in millions)	FY 02 Act	FY 03 Act	FY 04 Act	FY 05 Act	FY 06 Act	FY 07 Proj	FY 07 Act	FY 08 Proj	FY08 Act	FY 09 Proj	FY09 Act	FY 10 Proj	FY 11 Proj
Return on Investment													
External Funding Federal, State & Local	\$ 1.40	\$6.30	\$5.60	\$1.30	\$4.20	\$2.50	\$4.10	\$2.80	\$3.10	\$3.10	\$3.40	\$3.40	\$3.70
External Funding Other	n/a	n/a	n/a	n/a	\$0.90	\$0.30	\$0.05	\$0.50	\$0.00	\$0.50	\$0.30	\$1.00	\$1.00
Number of Scholarly Publications	12	0	59	38	47	20	65	30	10	30	12	40	40
Technology Transfer													
Patent Applications Generated	1	2	2	1	3	2	1	2	1	2		2	2
Products Generated and in the Marketplace	0	5	0	2	1	1	0	2	0	1		2	2
Business Expansions	0	0	0	2	1	1	1	1	0	1		1	1
Technology Transfer: startup companies created	0	2	1	0	1	0	1	1	0	0		0	1
Industry Partnerships	0	2	2	2	8	1	4	1	5	2	2	1	2
Economic Development													
Incubation/Formation of Biotech Concerns in Flagstaff/Northern Arizona	0	0	0	2	2	0	0	0	0	1		1	2
Work Force Contributions													
Graduate/Postdoc Students in Pipeline	60	62	60	25	29	10	26	20	24	20	5	25	30
Undergraduate Students with Research Experience	80	79	43	53	90	70	41	80	10	100	25	110	125
M.S./Ph.D. Graduate Increases	1	12	5	8	10	3	0	3	0	3		3	3
Specific Collaborations													
New Research Collaborations	6	29	3	17	28	2	13	2	10	5	10	5	7

RECENT ACCOMPLISHMENTS

- Recent research in the Nishikawa lab has focused on the muscle protein titin, and mechanical models of how this important muscle component functions within humans and animals. Understanding and modeling the interactions of the various muscle proteins may lead to advanced, human-engineered actuators that perform mechanical work using the same principles found within our muscles, leading to new artificial muscle devices. Work by Nishikawa and others has recently led to provisional patent applications in this area.



Simple mechanical model of muscle protein titin (provisional patent application).

- Infectious biofilms may play a role in numerous human diseases. The Leid lab at NAU has been studying infectious biofilms related to tuberculosis and to infections that accompany cystic fibrosis. Also, recent collaborative work has led to the development of lateral-flow testing devices (similar to OTC pregnancy tests) that detect the presence of dangerous biofilms. This work has led to 4 pending patents on the technology.

- GBI has funded the recent purchase of a ICPMS mass spectrometer to be operated in the Ketterer analytical laboratory. This instrument allows for high resolution analysis of dangerous trace metals in the environment, with part-per-trillion sensitivity. It is also used for high-resolution quantification of various proteins and biomolecules. Both undergraduate and graduate students will receive hands-on training on the



ICPMS mass spectrometer for trace analysis and student training in mass spectrometry.

- Work in the Gage laboratory focused on specific molecular targets for antibiotic drug development has resulted in a new intellectual property disclosure and provisional patent application.

FINANCIAL INFORMATION

	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Actual	FY 2007 Actual	FY2008 Actual	FY 2009 Budget	FY 2009 Actual	FY 2010 Rev Budget	FY 2011 Rev Budget
REVENUE											
Carry Forward	\$0	\$363,216	\$510,270	\$200,490	\$353,276	\$341,247	\$342,851	\$216,763	\$216,763	\$66,097	\$0
New TRIF Revenue	\$967,002	\$1,123,132	\$817,501	\$768,000	\$807,951	\$918,732	\$533,507	\$300,551	\$303,571	\$284,324	\$283,809
TOTAL REVENUE	\$967,002	\$1,486,348	\$1,327,771	\$968,490	\$1,161,227	\$1,259,979	\$876,358	\$517,314	\$520,334	\$350,421	\$283,809
OPERATING BUDGET											
Personal Services	\$216,402	\$377,561	\$706,203	\$696,382	\$345,031	\$516,128	\$208,418	\$168,258	\$174,182	\$223,597	\$170,000
Operating	\$387,384	\$598,517	\$603,157	\$67,366	\$474,949	\$400,999	\$451,177	\$349,056	\$280,055	\$126,824	\$113,809
TOTAL EXPENDITURES	\$603,786	\$976,078	\$1,309,360	\$763,748	\$819,980	\$917,127	\$659,595	\$517,314	\$454,237	\$350,421	\$283,809
ROI *	5.1 : 1	3.4 : 1	3.0 : 1	7.2 : 1	2.0 : 1	3.0 : 1	12.3:1	3.2 : 1	4.2:1	3.3 : 1	3.4 : 1

* New ROI methodology was used in FY 2007, and will continue to be used for all future years. This is an ABOR requested calculation change from FY 2002-2006..

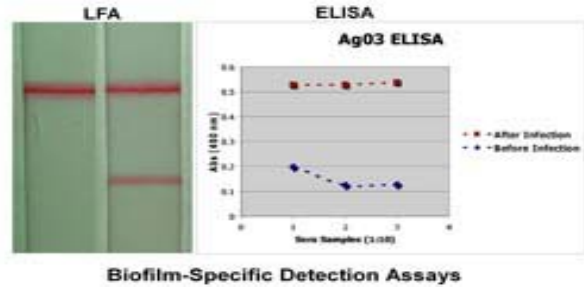
Funding of the Arizona Board of Regents' Technology and Research Initiative Fund (TRIF) is provided by a 0.6 percent increase in the Arizona sales tax rate approved by the voters through Proposition 301 on the November 2000 general election ballot.

GOALS

GBI will foster biotechnology innovation, discovery, technology transfer, and workforce development.

Specific goals include:

- ◆ Facilitate technology transfer including patents, licenses, and new businesses based in the biosciences.
- ◆ Work closely with the City of Flagstaff and the Northern Arizona Center for Emerging Technologies in recruiting and developing new biotechnology business in Northern Arizona.
- ◆ Create and refine courses in biotechnology and related fields, and update instrumentation to provide the training and experience NAU graduates will need to be productive members of Arizona’s biotechnology workforce.
- ◆ Create and maintain partnerships with government, business, and research institutions. Focus on our relationships with University of Arizona and Arizona State University to build the State’s bioscience capacity.



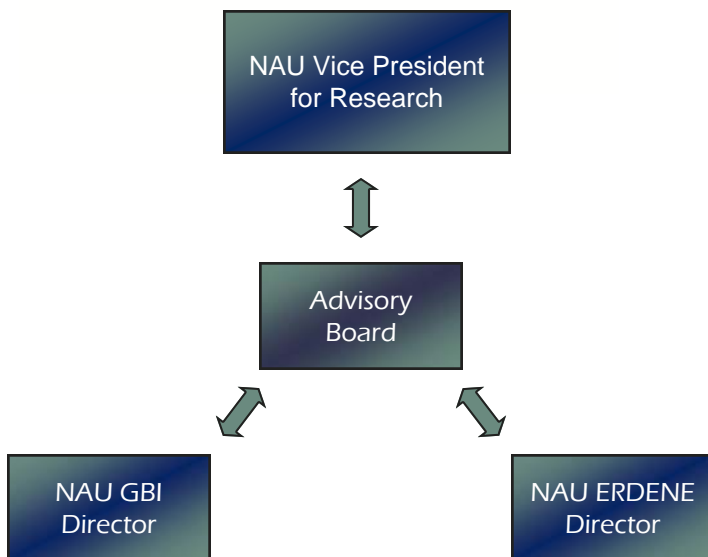
New lateral flow detection for infectious biofilms (4 patents pending).

MANAGEMENT

GBI’s director, Dr. Tim Porter, reports to Dr. Laura Huenneke, Vice President for Research, for TRIF related activities. Research initiatives within GBI report to Dr. Porter.

ADVISORY BOARD

The Research and Development Advisory Board was formed to oversee Growing Biotechnology (GBI) and Environmental Research, Development, and Education for the New Economy (ERDENE) Initiatives. This board consists of NAU deans, faculty, and professionals with expertise in environmental and/or biotechnology areas.



Michael Bittner

Translational Genomics Research Institute

Russ Yelton

Northern Arizona Center for Emerging Technologies

Barry Gold

Gordon and Betty Moore Foundation

David LaRoche

U.S. Environmental Protection Agency

Paul Jagodzinski

NAU College of Engineering, Forestry and Natural Sciences

Mary O’Connell

New Mexico State University Plant and Environmental Science Department

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LEARN MORE

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