

Table of Contents

Introduction

Letter from Chairman & President 1

About the Authority 3

RESEARCH

Basic Research Grant Program 4

Applied Research Grant Program 5

Experimental Program to Stimulate Competitive Research 6

ADVentures in Excellence 7

TECHNOLOGY

Technology Transfer Assistance Grant Program 8

Arkansas Manufacturing Extension Network 9

Technology Transfer Services Program 11

DEVELOPMENT

Technology Development Program 12

Seed Capital Investment Program 12

FISCAL YEAR 1998

Expenditure Report 13

Authority Board of Directors 14

Authority Staff 15

Introduction

Letter from Chairman and President

Dear Governor Huckabee
& Distinguished Legislators:

The Board of Directors and staff of the Arkansas Science & Technology Authority are pleased to submit to you the Authority's Fiscal Year 1998 Annual Report. The report summarizes the scientific and technological projects by which the Authority carries out its statutory mission to bring the benefits of science and advanced technology to the people and state of Arkansas. It is different from previous reports because it represents a transitional format as the Authority converts to electronic reporting and Web-based publishing.

The Board reviewed and adopted five goals for FY98:

Goal 1. Continue to offer the Authority's existing products and services. The Authority has continued to do this, as we indicate later in this report.

Goal 2. Become more of an information organization. The Authority has moved in this direction with investments in a new network server, software, and processes for managing information. For example, the Authority's Fiscal Year 1998 Annual Report is the first one prepared by the Authority for electronic access and will be the first document posted to the new Web site that is under construction.

Goal 3. Find interesting technologies, nurture them, move them to the marketplace, and create new businesses and jobs in the process. The 1996 Arkansas R&D Plan identifies six research areas -- (1) Advanced Materials, (2) Agriculture and Biology, (3) Biotechnology, (4) Environment, (5) Manufacturing, and (6) Transportation and Logistics -- and two support areas -- (1) Human Resources and Communications, and (2) Information Technology -- that are important to the state's economic future. The Authority will seek non-financial memorandums of understanding as a way to explore and further develop its understanding of research and development needs in these areas. It is expected that these relationships will lead to proposals for research and commercialization funding through Authority programs.

Goal 4. Help build the education infrastructure for the future. The Authority has done this through its research programs and the ADVentures in Excellence project.

Goal 5. Contribute to the preparation of a coherent research and development road map. The Authority has begun a number of activities for the Authority's R&D planning.

In FY98, the Authority continued to invest in opportunities for Arkansas to move forward in its scientific and technological endeavors. The report highlights these investments and shows how researchers, universities and enterprises are able to strengthen Arkansas' scientific and technological infrastructure through basic and applied research grants, technology development, technology transfer services, technology transfer assistance grants, and seed capital investment programs. These investments are summarized in the table below.

Table. Summary of Board Actions on Projects and Investment
Board Meetings During FY98

Projects	9/19	11/21	1/16	3/20	5/15	Projects	Investment	
Applied Research	1			1		2	\$66,599	
Basic Research	4			3		4	11	353,195
TDP					2	2	79,200	
TTAG	28*	5	5	9	4	51	143,110	
EPSCoR					1	1	2,400,000	
Network					1	1	272,502	
Seed Capital			1			1	50,000	
TOTAL							\$3,364,606	

TDP: Technology Development Program

TTAG: Technology Transfer Assistance Grant
EPSCoR: Experimental Program to Stimulate Competitive Research

*These projects were accepted in FY98 but were funded under Resolution Number 97-32 in Fiscal Year 1997.

The emphasis on a single fiscal year misses the continuity of the Authority's large-scale, multi-year initiatives with federal partners, such as the National Institute of Standards and Technology's Manufacturing Extension Partnership. The Authority is the managing partner of this six-year initiative designed to support the state's small and medium-sized manufacturing enterprises.

The Authority continues to work in the challenging areas of telecommunications and distance learning. With your ongoing support, the Authority will continue to meet the challenges of efficiently and effectively carrying out its mission.

We are proud of our achievements and thank you for the opportunity to serve our state. We appreciate your support of the Arkansas Science & Technology Authority.

Sincerely,

P. Michael Murphy
Chair, Board of Directors

John W. Ahlen, Ph.D.
President

About the Authority

The Arkansas Science & Technology Authority (the Authority) was created by statute in 1983 with the mission to bring the benefits of science and advanced technology to the people and state of Arkansas. This mission is addressed by strategies to promote scientific research, technology development, business innovation, and math, science and engineering education.

The Authority is comprised of a Board of Directors, Advisory Committees and staff. The 14-member Board is appointed by the Governor to staggered four-year terms. The Board has three directors who are scientists or engineers, two directors who are representatives of academic institutions, five directors who represent the private sector, three directors who represent the private sector and have knowledge and experience in the field of manufacturing, and the Director of the Department of Higher Education (or the Director's designee). One member each from the Arkansas Senate and House of Representatives serve as non-voting, ex-officio directors.

The Authority's staff is led by the President, the chief executive officer, who is responsible for the agency's programs, services and support functions.

The Authority's activities are divided into three programmatic areas that include research, development and technology transfer. This report details each programmatic area and reports action taken during FY98.

The Board determines the allocation of funds to all projects supported by the Authority. Three Board standing committees, comprised exclusively of members of the Board, make recommendations to the full Board. Advisory Committees, comprised of Board and non-Board members, offer additional inputs to the Authority. Annual reports for the EPSCoR Advisory Committee, the Manufacturing Resource Advisory Committee and the newly created Client Advisory Committee are available. All of the Authority's activities are audited annually to ensure compliance with state and federal guidelines.

The Authority can be reached at:

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Research

Basic Research Grant Program

Purpose: The Program encourages, establishes and supports basic research in science and engineering at Arkansas colleges and universities.

Program

Description: The Arkansas Science & Technology Authority's Basic Research Grant Program is a competitive, (60 percent state: 40 percent institution) matching grant effort to support basic research in science and engineering. The goals of the Basic Research Grant Program are to promote and support the growth and development of Arkansas scientists and to enhance the status of science and engineering in Arkansas colleges and universities.

Awards: The Board approved 11 projects for FY98, representing a total investment of \$353,195.

Proposal Inst.	(1) P.I.	(2) Project Description	Amount
98-B-13	UAF Sagers	A Phylogenetic Analysis of the Evolution of Plant Defense.	\$28,965
98-B-16	UAF McIntosh	A Novel and Efficient Approach to Castanospermine and Related Indolizidine Alkaloids.	38,735
98-B-17	UAF Tao	X-Ray Absorption Compensation and Laser 3-D Imaging for Bone Detection in Meat Fillets.	37,005
98-B-20	UAMS Zhang	Mechanism of Coronavirus RNA Transcription.	37,000
98-B-31	UAF Retakh	Noncommutative Quasideterminants and Their Applications.	13,202
98-B-34	UAMS Chen	The Role of Altered MyoD1 Methylation in Rhabdomyosarcoma.	32,489
98-B-36	UAMS Hurlburt	Structure and Function of the SarA Virulence Gene Regulator of <i>S. aureus</i> .	38,750
98-B-39	UAF Lanzani	Singular Integrals on Non-Smooth Domains and Applications.	17,383
98-B-42	UAF Paul	Construction of an Immunochemical Biosensor for Rapid and Sensitive Detection of Salmonella.	44,906
98-B-43	UAF Henry	Protein Targeting to the Chloroplast Thylakoid Membrane.	44,099
98-B-45	Lyon Lovelace	Metabolism of Proenkephalin A Products in the Canine Heart.	20,661

TOTAL: \$353,195

(1) Institution: UAF, University of Arkansas, Fayetteville; UAMS, University of Arkansas for Medical Sciences; and Lyon, Lyon College.

(2) Principal Investigator.

Applied Research Grant Program

Purpose: The Program provides incentives to Arkansas industry to participate in applied research. A goal is to encourage investment by industry in the transfer of science and technology from Arkansas colleges and universities.

Program

Description: The Arkansas Science & Technology Authority's Applied Research Grant Program is a (50:50) cash-matching effort to support applied research in science and engineering. (A match of \$2 from the state is available for every \$1 from an Arkansas business with 50 or fewer employees.) The goal of the Applied Research Grant Program is to stimulate the transfer of science and technology in Arkansas by enhancing opportunities for research partnerships between Arkansas colleges and universities and private industries.

Awards: The Board approved two projects for FY98, representing a total investment of \$66,599.

Proposal	Inst. (1)	P.I. (2)	Project Title	Amount
			Co-Sponsor	Match
98-A-01	UAF	Balda, Waite, Martin	Manufacturer-University Interactions for Product Development and/or Enhancement	\$26,599
			Baldor Motors & Drives	\$26,599
98-A-02	UAF	Daniel	Reducing Ammonia Loss and Phosphorus Runoff from Swine Manure with Aluminum Sulfate	40,000
			General Chemical	50,000
			TOTAL:	\$76,599 \$66,599

(1) Institution: UAF, University of Arkansas, Fayetteville.

(2) Principal Investigator(s).

The Research and Development Tax Credit Program is associated with the Applied Research Grant Program. The Tax Credit Program allows credits to industry for contribution of research funds or new equipment to institutions of higher education. The Program allows credits against a taxpayer's Arkansas state income tax for support of certain qualified applied research expenditures at qualified institutions.

Credit: One credit for \$1,866.67 was approved in FY98.

Proposal Industry/Company	Project Title	Amount
96-A-02 Baldor Electric Company	Cost Effective Solutions to Particular Difficulties Associated with Adjustable Speed Drives	\$1,866.67
	TOTAL	\$1,866.67

Experimental Program to Stimulate Competitive Research (EPSCoR)

Purpose: The Arkansas Science & Technology Authority's EPSCoR effort provides state matching funds for federally-approved research projects.

Project

Description: EPSCoR attempts to increase federally supported research in Arkansas institutions of higher education. EPSCoR's goal is to bring Arkansas' science and engineering research to nationally and internationally competitive levels. Guided by an advisory committee to the Authority's Board of Directors, the project is also charged with planning and implementing an effort that would increase federally supported research at colleges and universities.

The federal agencies that participate in EPSCoR include the National Science Foundation, the Environmental Protection Agency, the Departments of Agriculture, Defense, and Energy, the National Aeronautics and Space Administration, and the National Institutes of Health.

Awards: The Board approved three resolutions in FY98, representing a total investment of \$2,400,000.

Resolution	Inst. (1)	P.I. (2)	Project Title	Amount
98-09	UALR	Hudson (3)	NASA training grant matching funds	\$150,000
98-25	UAF, UAMS	Hehr, Lindley	Arkansas NSF EPSCoR Cooperative Agreement	2,000,000
98-26	UAF	Xiao	NSF EPSCoR Grant: A Semiconductor Optical Interconnect Device Fabrication Facility Targeted Toward Enhanced Information Processing	250,000
			TOTAL	\$2,400,000

(1) Institution. UALR, University of Arkansas at Little Rock; UAF, University of Arkansas, Fayetteville; and UAMS, University of Arkansas for Medical Sciences.

(2) Principal Investigator(s).

(3) Director of the Arkansas Space Grant Consortium.

ADVentures in Excellence

Purpose: ADVentures in Excellence is the continuation of the Ventures in Education pilot project that was initiated in 1991 to implement an innovative effort for increasing academic achievement among minority and low-income high school students in the Arkansas Delta.

Project

Description: The mission of ADVentures in Excellence is to create lasting school improvement, measured by student performance, through reform in school culture, curriculum and instructional practices, with special emphasis on mathematics and science -- insuring that ADVentures students will be prepared for success in post-secondary education and the workplace.

The ADVentures project model combines curriculum enhancement, high quality faculty development and intensive career guidance to motivate and prepare students for success in college, post-secondary training and employment. ADVentures builds basic reading comprehension, mathematics and analytical reasoning skills, while students advance through high school. Its primary academic focus is on mathematics and the sciences. Eight schools from four districts participated in the project.

The Board authorized \$150,000 in FY97 that was expended in FY98 for ADVentures in Excellence.

Technology

Technology Transfer Assistance Grant Program

Purpose: The Technology Transfer Assistance Grant Program (TTAG) assists Arkansas' enterprises in developing or improving products or processes through the transfer of technical solutions to technology-based, industry-driven problems, thus enhancing that enterprise's market competitiveness.

Program

Description: The Arkansas Science & Technology Authority provides limited financial support for the transfer and deployment of innovative technology. The Authority will fund up to \$3,750 of costs associated with transferring new or existing technology from a qualified applicant -- such as a public or private enterprise, laboratory, college or university -- to an enterprise based in Arkansas. Up to \$5,000 of total project costs will be considered, with the first \$2,500 funded by the Authority; the remaining \$2,500 is cost-shared equally (50:50) between the Authority and the enterprise. Each enterprise is eligible to receive assistance for two technology transfer projects per year. Projects are evaluated on a competitive basis.

Awards: The Arkansas Science & Technology Authority's Board of Directors authorized investments totaling \$166,727.50 through TTAG to help clients solve 50 technical problems. The private sector invested an additional \$62,488.20 in these solutions. These investments assisted 42 separate companies, located in 22 counties representing the following 14 Standard Industrial Classification (SIC) groups:

SIC Grouping	Number of Investments
Fabricated Metal Products	10
Rubber & Misc. Plastic Products	9
Electronic & Other Electrical Equipment	5
Industrial and Commercial Machinery	4
Lumber & Wood Products	4
Chemicals & Allied Products	3
Furniture & Fixtures	3
Misc. Manufacturing Industries	3
Other Industries	2
Paper & Allied Products	2
Printing, Publishing & Allied Products	2
Food & Kindred Products	1
Stone, Clay, Glass & Concrete Products	1
Transportation Equipment	1
TOTAL	50

Client Company Profile

Average Number of Employees	115 employees
Average Year Corporation Founded	1972
Most Active Counties	Pulaski & Sebastian Counties, each with six investments
Average Authority Investment	\$3,326.85
Average Client Investment	\$1,277.93

Services Rendered	Number of Investments
Quality / Inspection	28
Product Development & Design	5
Business Systems/Business Management	4
Plant Layout	4
CAD / CAM / CAE(1)	3
Process Improvement	3
Environmental	2
Other	1

TOTAL 50

(1) Computer Aided Drafting / Computer Aided Manufacturing / Computer Aided Engineering.

Arkansas Manufacturing Extension Network

Purpose: The Arkansas Manufacturing Extension Network (Network) is designed to improve Arkansas' manufacturing and industrial competitiveness through the delivery of comprehensive technical and business assistance services.

Network

Description: The Network is an affiliate of the National Institute of Standards and Technology Manufacturing Extension Partnership and is in year three of a six-year effort. It strives to improve the quality, productivity and global competitiveness of Arkansas' small and medium-sized manufacturers by providing technical and business management assistance services.

The Network's primary partners are: the Arkansas Economic Development Commission; the Arkansas Center for Technology Transfer at the University of Arkansas, Fayetteville; the Business and Industrial Institute at Westark College, Fort Smith; the Center for Competitive Manufacturing at Southern Arkansas University Tech, Camden; the Center for Economic Development at Arkansas State University, Jonesboro; the College of Science and Engineering Technology at the University of Arkansas at Little Rock; the Center for Economic Development at Henderson State University, Arkadelphia; and Winrock International, Morrilton.

Eight field engineers deliver services to manufacturers. Typical services include technical and feasibility assessments, cost/benefit analysis, technology implementation, information transfer and resource partnering.

Awards: The Board approved funding in the amount of \$106,934 to support three field engineers, one each at: the University of Arkansas, Fayetteville; the University of Arkansas at Little Rock; and Arkansas State University. Other Network operations for FY98 were funded from the previous year's awards.

In other action, the Board approved the creation of a Client Advisory Committee that includes members of the Board's Industry Committee and up to 10 manufacturing representatives. This committee provides strategic direction for the Network.

In FY98, Network engineers completed 119 informal engagements that included initial contact and consultation, and 49 service agreements or value added projects in the following 15 Standard Industrial Classification (SIC) groups:

SIC Grouping	Number of Service Agreements
Industry Machinery & Equipment	8
Chemical & Allied Products	6
Fabricated Metal Products	5
Service Agreements with Other	5
Miscellaneous Manufacturing Industries	4
Rubber & Miscellaneous Plastic Products	4
Food & Kindred Products	3
Lumber & Wood Products	3
Furniture & Fixtures	2
Paper & Allied Products	2
Primary Metal Industries	2
Transportation Equipment	2
Leather & Leather Products	1
Measuring & Controlling Devices	1
Stone, Clay & Glass Products	1

TOTAL 49

Services Rendered	Number of Service Agreements
Quality/Inspection	17
General	8
Process Improvement	7
Control Systems Integration	4
Business Systems/Business Management.	3
Human Resources	3
CAD / CAM / CAE(1)	2
Material Engineering	2
Plant Layout/Manufacturing Cells	2
EDI/Communications/LAN(2)	1
TOTAL	49

- (1) Computer Aided Drafting / Computer Aided Manufacturing / Computer Aided Engineering.
- (2) Local Area Network (Electronic Data Interchange).

Technology Transfer Services Program

Purpose: The Technology Transfer Services (TTS) Program informs the state's private and public sectors of the availability of technologies developed in various federal laboratories, particularly those of the National Aeronautics and Space Administration (NASA).

Project

Description: Since 1993, the Authority has worked with representatives of NASA's Marshall Space Flight Center (MSFC) in Huntsville, Alabama, and the Mid-Continent Technology Transfer Center (MCTTC) located in College Station, Texas, to conduct technology transfer outreach activities across the state. In September 1997, MSFC and MCTTC staff provided highlights of NASA-developed technologies and outreach activities to the Authority's Board of Directors.

To better leverage existing resources, MSFC began, and will continue, to move its focus to the development and infusion of new technology to address the longer-term needs of industry. Field engineers from the Arkansas Manufacturing Extension Network will conduct direct technical outreach activities formerly conducted by MSFC staff. MSFC will explore the most efficient ways to promote the patents and licensing opportunities available from NASA and will move toward providing technical assistance through prepared packages. The goal of this partnership will be to produce new ideas that can be commercialized in the form of products, processes or new materials, or otherwise benefit the community.

A calendar year 1997 Annual Report to the Governor of Arkansas is available.

Development

Technology Development Program

Purpose: The Technology Development Program provides assistance in development and commercialization of new technology-based products and processes through innovative technology development projects.

Program

Description: The Program may provide monies to qualified applicants if their proposed project possesses a well-defined and comprehensive project plan and promotes the purpose of the Arkansas Science & Technology Authority. The maximum award is limited by law to \$50,000. Awards are considered investments with terms negotiated on a case-by-case basis with a maximum 5 percent royalty on net sales for a maximum period of 10 years.

Investments: The Board approved two investments in FY98, representing a total investment of \$79,200.

Proposal Awardee	Description	Funds Approved
98-TDP-01	UAMS(1) Cetylpyridinium Chloride as an Antimicrobial Treatment in Food Processing.	\$50,000
98-TDP-02	Audio Access(2) Multi Channel Assitive Listening System	29,200
	TOTAL	\$79,200

(1) UAMS, University of Arkansas for Medical Sciences.

(2) Company withdrew its request for assistance.

Seed Capital Investment Program

Purpose: The Seed Capital Investment Program (SCIP) fosters the development of innovative technology-based businesses and projects that will stimulate economic growth and industrial competitiveness in Arkansas.

Program

Description: The Program assists in the initial capitalization or expansion of Arkansas-based businesses undertaking projects that are science or technology-based and have a commercial or job creation potential. Each dollar invested by SCIP is leveraged by three dollars in matching funds from other sources. SCIP is limited to working capital, and does not finance fixed assets.

Investment: The Board approved one investment in FY98.

Proposal Company	Description Approved	Funds Dispersed	Amount
98-S-01 Contourmed, LLC	Initial capitalization investment.	\$150,000	\$50,000

Fiscal Year 1998
 Expenditure Report
 June 30, 1998

App/All(1)	General Revenue Character	Appropriation Balances	Y-T-D Budget	Expense	Percentage of Balance Budget
678/01	REGULAR SAL	444,751 433,257	399,299.73	33,957.27	92.16
	EXTRA HELP	12,000 2,736	2,670.00	66.00	97.59
	M & O	144,204 130,204	118,183.21	12,020.79	90.77
	FRINGE	115,572 113,651	97,706.01	15,944.99	85.97
	RESEARCH	900,000 733,092	659,782.77	73,309.23	90.00
	CONFERENCE	19,294 19,294	18,061.54	1,232.46	93.61
	PROF FEES	16,800 16,800	12,818.26	3,981.74	76.3
	CAPITAL OUTLAY	17,000 17,000	6,793	4,684.20	2108.80
	TECH DEV	375,000 239,679	235,949.50	3,729.50	98.44
	TOTAL ACT 50 of 1997	2,044,621	1,695,506	1,549,155.22	146,350.78
					91.37

App/All	Cash Character	Appropriation Balances	Y-T-D Budget	Expense	Percentage of Balance Budget
A87/01	SEED CAPITAL	1,900,000	1,900,000	50,000.00	1,850,000.00 2.63
B16/02	NETWORK/ENERGY	60,366	60,366	0.00	60,366 0.00
B16/01	TECH DEV/ENERGY	147,126	147,126	0.00	147,126.00 0.00

App/All	MEP Federal Character	Appropriation Balances	Y-T-D Budget	Expense	Percentage of Balance Budget
919/02	REGULAR SAL	235,724 113,971	78,772.28	35,198.72	69.12
	M & O	245,000 69,107	44,257.95	24,849.05	64.04
	FRINGE	59,818 29,340	20,789.85	8,550.15	70.86
	GRANTS	272,502 272,502	106,934.00	165,568.00	39.24
	CONF FEES	44,402 19,563	14,035.64	5,527.36	71.75
	PROF FEES	5,000 4,281	0.00	4,281.00	0.00
	CAPITAL OUTLAY	61,200 22,182	16,318.25	5,863.75	73.57
	FIELD SERVICES	985,360 935,292	313,342.50	621,949.50	33.50
	MISC FEES	496,200 5,000	800.00	4,200.00	16.00
	TOTAL 2,405,206	1,471,238	595,250.47	875,987.53	40.46

App/All	Gen. Improvement Character	Appropriation Balances	Y-T-D Budget	Expense	Percentage of Balance Budget
960/46	NETWORK	1,200,000	600,000	0	600,000 0.00
966/04	GRANTS, NASA	150,000	150,000	150,000	0 100.00
964/46	EPSCoR	6,000,000	2,000,000	0	2,000,000 0.00
961/46	NETWORK ENHANCEMENT	918,324	500,000	0	500,000 0.00
962/04	HSU/ENHANCEMENT	100,000	0		
963/04	WINROCK/ENH	100,000	0		
965/04	VIE PILOT PROJECT	374,882	300,000	150,000	150,000 50.00
	TOTAL ACT 562 of 1997	8,843,206	3,550,000	300,000	3,250,000 8.45
233/04	EPSCoR	1,000,000	21,435	0	21,435 0.00

(1) Appropriation/Allocation

Board of Directors

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Fidelity Bank
West Memphis

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Merchant's Investment Center
Fort Smith

Ex-Officio Members

Honorable Allen Gordon
State Senator
Morrilton

Honorable Joe Hudson
State Representative
Mountain Home

(1) Term expired during FY98.

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(1) Separated from Authority during FY98.