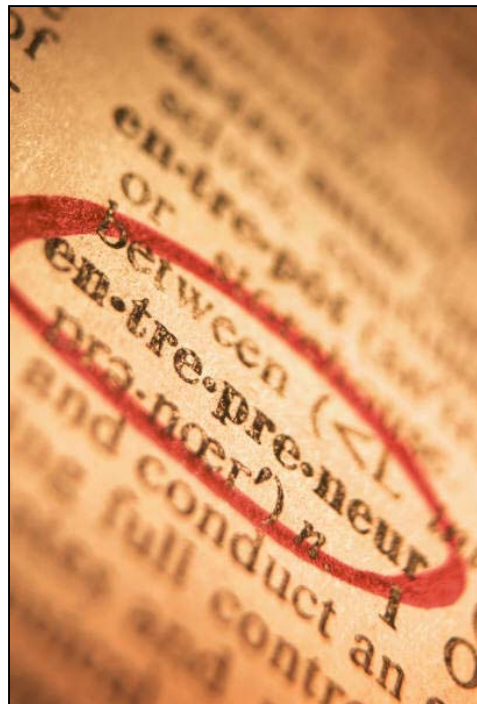

Preliminary Recommendations

Entrepreneurial Assistance Work Group



PREPARED FOR:
The Flinn Foundation

PREPARED BY:
Technology Partnership Practice
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Cleveland, Ohio

Arizona Biosciences Entrepreneurial Assistance Work Group

INTRODUCTION

The Flinn Foundation commissioned *Arizona's Bioscience Roadmap* in April 2002 and released the study results in December 2002. This Roadmap laid out a set of strategies and actions to position Arizona in selective fields of the biosciences, both in research stature and commercialization and consequent economic impact of this research. Four strategies and nineteen proposed actions were contained in the Roadmap.

In early 2004, Flinn formed selective Work Groups for several of these key economic actions related to the commercialization of this research and insuring its contributions to the state's economy in the future. Among the actions selected for further review and positioning for action were those related to financing biosciences firms (capital formation); facilities for biosciences firms; and entrepreneurial support in the formation of biosciences firms (including assistance in securing Federal SBIR support). This report discusses the deliberations of the last of these three items—the Entrepreneurial Assistance Work Group—and the suggested actions to move forward in the short and long term.

Bob Hagen, Chair of the Southern Arizona Tech Council, and Richard Baron, President of the Northern Arizona Technology & Business Incubator, co-chaired this Work Group. Additional staff support was provided to the Work Group by Sandra Johnson, Associate Director at the Flinn Foundation as well as by the Battelle Memorial Institute, retained by the Flinn Foundation to assist in both the development of the *Arizona's Bioscience Roadmap* and in its implementation. The Work Group's complete membership is attached at the end of this report (Appendix A).

While building Arizona's research base is a prerequisite to creating a set of industries in the biosciences, ways also must be found to commercialize that research. In places with a strong entrepreneurial culture leading to formation of many bioscience firms this is seen as a routine matter rather than an unusual occurrence. A common refrain in many states and regions is that while "referral" mechanisms for start-ups abound, organizations with serial entrepreneurial management skills and experience in the biosciences are scarce. Offering ways to tap such expertise through what is termed entrepreneurial assistance is a way to increase the birth of bioscience firms and increase their survival rate. However, the experience throughout the U.S. is that because the business model for business formation and survival of biosciences firms is so different from that of other technology-driven firms, including software, communications, computer hardware, environmental and advanced manufacturing, many of the key segments making up biosciences must have entrepreneurial assistance specialized in their industries and fields, and not be part of a more generalist entrepreneurial assistance organization.

The *Arizona's Bioscience Roadmap* stated that the private and public sectors in Arizona need to find ways to "provide in-depth comprehensive entrepreneurial assistance to startup and emerging bioscience entrepreneurs/firms." A related action stated in the

Roadmap that can also be addressed in this report is the need to increase help to entrepreneurs to secure Federal SBIR/STTR Program funds. The Roadmap noted that other states and regions that have built biosciences-driven economies found that building an entrepreneurial culture required many steps and actions, among them:

- Coaching and mentoring by serial entrepreneurial managers.
- Networking and support with knowledgeable business service providers/firms/faculty and others.
- Developing of angel networks to provide the informal risk capital critical to business formation in a firm's early months and years.
- Knowledge and experience specific to the biosciences.

Characteristics of an in-depth entrepreneurial assistance effort as stated in the *Arizona's Bioscience Roadmap* included:

- In-depth assistance to entrepreneurs in the areas of capital, marketing, regulatory and management.
- Staffed by seasoned entrepreneurial managers, perhaps attracted from San Diego.
- Managing the Arizona BioSeed Fund and the Technology Commercialization Prototype Development Fund (two other actions in the Roadmap) within the same organization responsible for entrepreneurial assistance—perhaps organized as an integrated entrepreneurial center.
- Funding support of \$900,000 per year for this level of personnel and experience, but by sharing these costs with the BioSeed Fund and the Technology Commercialization Prototype Development Fund net costs might be reduced to \$400,000-600,000 annually.

WORK GROUP DISCUSSIONS AND DELIBERATIONS

The Entrepreneurial Assistance Work Group met from February through July 2003. The Group first discussed the Roadmap's findings and conclusions. At the first and second meetings each of the participating groups and organizations had the opportunity to discuss their entrepreneurial assistance activities and any specialized support or assistance focused on biosciences firms. A summary of the entrepreneurial assistance activities of these groups is contained in Appendix B of this report. At the third meeting of the group findings of an internet-based survey of participating groups and organizations were shared and discussed, leading to preliminary conclusions as to the recommendations for actions, both short and long term in entrepreneurial assistance. The fourth and final meeting addressed an earlier draft of this report. This report summarizes those conclusions and recommendations and the deliberations of the Work Group.

Describing Entrepreneurial Assistance Support for Bioscience Firms

Figure 1 provides a schematic layout of the possible types of entrepreneurial assistance and support that might be provided to a bioscience firm through its various life-cycle

stages, from its research and development stage, technology commercialization stage, and early stage production operations:

- At the research and development stage a bioscience firm is primarily interested in intellectual property management help, technology transfer issues, and other activities related to determining if the research is of sufficient value to form a firm with an identified service or product.
- At the technology commercialization stage a bioscience firm is interested in market assessment of its technology and prototype development. The firm is now moving toward business plans, needs mentoring and coaching help, help in formulation of a management team and plan, and access to startup capital sources.
- At the early stage production operations stage, a bioscience firm may be interested in further product development and manufacturing, product introduction including testing and validation, regulatory review and support, marketing, general manufacturing practice regulatory support (GMP), related technical assistance and support, and obtaining later rounds of more formal venture capital and other sources.

Because Arizona’s bioscience industry base is somewhat immature and young, it would be expected that more attention would focus on those entrepreneurial assistance services at the research and development and technology commercialization stages over the next several years. As the industry matures, early stage production operations assistance will increase in need and priority.

Figure 1: Entrepreneurial Support Through Various Life Cycle Stages

Research and Development	Technology Commercialization	Early Stage Operations
<ul style="list-style-type: none"> ➤ Basic and Clinical Research ➤ Intellectual Property Protection* <ul style="list-style-type: none"> •Invention Disclosure •Patent Application ➤ Technology Transfer* <ul style="list-style-type: none"> •Firm Creation •License ➤ Translational Research* ➤ Proof-of Concept/Pre-Prototype Development* 	<ul style="list-style-type: none"> ➤ Market Assessment* ➤ Technology Assistance* ➤ Mentoring/Coaching* ➤ Access to Start-up Capital* <ul style="list-style-type: none"> •Angels •Pre-Seed/Seed •SBIR program ➤ Prototype Development ➤ Business Planning* ➤ Business & Management Team Formation* 	<ul style="list-style-type: none"> ➤ Product Development* ➤ Testing & Validation ➤ Regulatory Reviews* <ul style="list-style-type: none"> •FDA ➤ Marketing* ➤ Raising Growth Capital* <ul style="list-style-type: none"> •VC Funding •Corporate Funding ➤ Management Team/ Human Resource Development* ➤ Develop Manufacturing Procedure* ➤ Practical Problem Solving*

***Areas Entrepreneurial Support May Address**

The business model for most biosciences firms (e.g., research and testing, drugs and pharmaceuticals, agricultural biotechnology) is significantly different than many other industries due to the long FDA regulatory review process, including multiple clinical

trials and the ability to demonstrate the capacity to operate facilities meeting general manufacturing practice (GMP). Exceptions include medical device firms (although this depends on their product or device) and diagnostics firms whose product development cycle may be much shorter. Because of this long lead-time, bioscience firms generally need considerable amounts of funds for R&D to commercialization. They need to partner with hospitals and academic health centers in clinical trials. They must develop products with revenue potential to capture this “valley of death” period of extensive R&D and technology commercialization. Consequently, the intensity and duration of business services for biosciences must also be deep and enduring.

BEST PRACTICES IN ENTREPRENEURIAL ASSISTANCE AND TECHNOLOGY COMMERCIALIZATION

Four examples were reviewed by the Work Group of entrepreneurial assistance offered in a comprehensive, in-depth nature. These included BCM at Baylor College of Medicine; the Technology Ventures Corporation affiliated with Federal Department of Energy labs in New Mexico; the Oklahoma Technology Commercialization Center; and the recently announced St. Louis Proof of Concept/Pre-Seed Fund initiatives.

The following pages provide additional details on each of these efforts.

BCM Technologies (BCMT)

Overview

- Developed to work closely with the Baylor College of Medicine’s (BCM’s) Office of Technology Administration to help decide how best to commercialize BCM technologies.

Research & Development

- Provides assessment services to determine technology feasibility.
- Determines whether BCM inventions are best commercialized through licensing to existing companies or by a spin-off.

Technology Commercialization

- Draft preliminary business plan for spin-off companies.
- Provide assistance to technology entrepreneurs in new business start-up including interim

management and management team recruitment.

- BCMT provides small pre-seed investments (\$50–\$100K).

Early Stage Operations

- BCMT participates in conjunction with “angel” and corporate investors in first-round financing.

Technology Ventures Corporation (TVC)

Overview

- Developed in cooperation with the U.S. Department of Energy’s Sandia and Los Alamos National Laboratories and the State of New Mexico.

Research & Development

- Provides assessment services to determine technology feasibility.

- Assistance in developing proof-of-concept models/prototypes.

Technology Commercialization

- Business case preparation assistance, mentoring and coaching.
- Defense Commercialization Initiative – funded by U.S. EDA.
- SBIR/STTR assistance.

Early Stage Operations

- New Mexico Equity Capital Symposium – including identifying early stage equity investors.
- Space assistance – via Sandia Science & Technology Park.



St. Louis Proof of Concept Fund

Determine commercial potential of ideas or research by:

- Due diligence/screening.
- Proof of concept funding.
- Mentoring/business plan development.
 - Cover experiments, market studies, financial plans
 - No ROI; nonprofit with foundation support
 - Board made up of universities, incubators and donors
 - Sources of research: universities, corporations
 - Firms formed from proof of concept could locate in incubators
 - One staff person plus consultants

- Funded by Danforth Foundation, McDonnell Foundation, Monsanto Fund, and Bunge at \$3 million
- State/tax credits at \$3 million

St. Louis Pre-Seed Fund

- Investments of \$250,000 to \$2 million
- Funded by Washington University Endowment, Danforth and McDonnell Funds at \$12.5 million
- Aimed at entrepreneurs receiving their first institutional VC investments.
- May use existing local VC manager (raising a second fund of \$25–50 million).
 - Negotiating arms length agreements to link Proof of Concept Fund/in return to get a portion of the VC's carry position

Oklahoma Technology Commercialization Center

Overview

- Operated by Oklahoma Technology Development Corporation with funding from (OCAST), focusing on “entrepreneurs” seeking assistance.
- Two principal locations: Oklahoma City and Tulsa.

Research and Development

- Provides assessment services to determine technology feasibility.
- Assistance in developing proof-of-concept models/prototypes.

Technology Commercialization

- *Technology Enterprise Program* – business opportunity review, assistance with investor

presentations and capital formation.

- *Oklahoma Capital Network* – includes OCAST Tech Business Finance Program (pre-seed funds), Accredited Angel Investors Network.
- Referral-based *Resource Group* of technology/engineering professionals willing to work with entrepreneurs on commercialization issues.
- *Technology Accelerator Program* – incubator facilities/services, entrepreneur training and mentoring program.

Early Stage Operations

- *Oklahoma Capital Network* – Enterprise Venture Capital Fund a private VC fund formed by Oklahoma Technology Development Corporation.

ARIZONA’S EXISTING ENTREPRENEURIAL ASSISTANCE DELIVERY SYSTEM

There are many local groups and organizations in Arizona providing a range of general and specialized business and entrepreneurial assistance support services (see Appendix B) from SBIR support to entrepreneurial boot camps, general business support, and seminars, workshops, and a range of other approaches. The level of entrepreneurial assistance and support is wide and involves many groups in Flagstaff, Phoenix and Tucson. The Work Group concluded that while there is general support open to non-bioscience and bioscience firms, the kinds of in-depth specialized support biosciences firms need as identified in Figure 1 is much more limited.

In part, local groups and organizations have not developed more intensive, customized biosciences support because of the relative youth of this industry in Arizona and its distribution widely in both Tucson and Phoenix. It is difficult to develop in-depth specialized capabilities if there is a lack of a critical mass of related biosciences firms. This is not a problem unique to Arizona. States and regions that have successfully built a critical mass of bioscience firms, such as Maryland and San Diego in the past 15 years, went through similar issues and problems. In both instances, specialized organizations and programs were established to provide specialized support such as CONNECT in San Diego. In other regions of the country, whether it is St. Louis, Missouri; Worcester,

Massachusetts; or Research Triangle, North Carolina—specialized approaches have or are being adopted or considered.

The conclusion of the Work Group is that this *Arizona's Bioscience Roadmap* action is important and needed. In-depth entrepreneurial assistance support for bioscience entrepreneurs is limited. ***If it is not addressed, it will be more difficult for Arizona to build a critical mass of bioscience firms and for Arizona's research base to contribute to the State's economy in terms of jobs and products.***

Entrepreneurial Assistance Support Assistance Needed for Bioscience Entrepreneurs

The specific services, which appear most in need in Arizona, are the following areas:

- **SBIR Support.** Ongoing assistance will be needed to assist Arizona entrepreneurs to take fuller advantage of the one billion dollar plus Federal Small Business Innovation Research Program (SBIR). This program requires major Federal funding agencies to set aside a percentage of their R&D budgets for competitive awarding of grants to small firms throughout the country. A separate action of the *Arizona's Bioscience Roadmap* called for increasing help to entrepreneurs to secure Federal SBIR/STTR Program funds. Arizona captures less than \$7 million a year from NIH in these funds with the level of awards to entrepreneurs in Arizona decreasing over the 1999–2001 time period. The Arizona Department of Commerce recently received a federal award for a FAST Program and has offered workshops and seminars and small grants to encourage more entrepreneurs to participate in this Federal program. Unfortunately, federal funding was eliminated in the current federal budget year.
- **Patent Protection.** Because of the importance of protecting the proprietary position of scientific discovery and consequent commercial application, both universities and entrepreneurs involved in the biosciences must be conscious of and make provisions to protect their intellectual property. Patent issues are complex and both qualified legal counsel and guidance on IP issues are important for bioscience entrepreneurs. Changes in how both U of A and ASU are handling their intellectual property, technology transfer and its commercialization will help address this issue for university faculty but will not help directly non-university entrepreneurs.
- **Access to Capital.** Because of the biosciences business model earlier described, including its long lead time and high burn rate, sources of patient capital at all stages of a firm's life cycle are needed. While a separate capital formation Work Group has been convened and is making recommendations regarding ways to encourage investments in capital funds and creation of capital funds, it is not addressing the related issue of how entrepreneurs access such capital sources. Equity capital sources include friends and neighbors, angels, private placements, pre-seed/seed funds, early stage and mid and later stage venture funds. Debt sources include working capital and financing of equipment. Entrepreneurial assistance providers knowledgeable of these sources, how they work, and their

applicability to the specific situations facing a bioscience entrepreneur can be critically important to both a firm's survival and growth.

- **Business Planning/Mentoring.** Most entrepreneurial groups and organizations in and outside Arizona will and do offer general business planning help, whether it be individually customized or offered in standard template fashion. While such assistance is important, for bioscience firms it does not go far enough. Due to unique capital needs, long periods of existence as a R&D organization, intellectual property issues, and other factors, experienced serial entrepreneurial managers that have gone through the process both successfully and unsuccessfully can serve as important coaches and mentors to the next generation of bioscience firms. Unfortunately, because of their compensation requirements, entrepreneurial support organizations can rarely hire and retain such experienced individuals to serve as mentors and coaches. The Pittsburgh Life Sciences Greenhouse has created an Executive Corps, recruiting and retaining key serial managers for up to 18 months to be available to be placed in positions in Pittsburgh life sciences firms as opportunities rise. In St. Louis, through its Proof of Concept and Pre Seed Fund, they are combining the mentoring role with responsibilities for business mentoring/coaching. This dual role enables experienced managers to be handled and their compensation levels addressed.
- **Prototype Development.** While ASU has earmarked a small portion of its state 301 funds to create an internal prototype development fund this is not sufficient in size to maximize its potential within ASU, let alone within the State. Because Federal funding of bioscience R&D projects may end too early to determine if a product and/or firm can be created from the effort, a number of research organizations throughout the U.S. are developing Prototype Development Funds to undertake the due diligence, proof of concept funding, and experiments, market studies, and financial plans required to move research into technology and commercial impact. The *Arizona's Bioscience Roadmap*, as a separate action, does call for support of prototype development and proof of concept activities. This is an important tool to build a critical mass of bioscience firms in the state around potential treatments, diagnosis, device or similar products or processes that may come out of research but which may go undisclosed unless support is provided to further develop the idea or approach.
- **Team Formation Support.** Entrepreneurial assistance organizations, like the Oklahoma Technology Commercialization Center, provide help to startups to focus their business plans and strategies but they also help identify and put together the management team necessary for the firm to attract outside capital and grow. Again, having serial experienced entrepreneurial managers serve as the providers of such support makes a major difference in the level and quality of support an entrepreneurial assistance organization can provide.
- **Market and Technology Assessments.** Bioscience entrepreneurs, even prior to forming a firm, need to know if their research results and pre-prototype concepts have market potential; whether there is competing existing technologies; and what markets and segments represent best opportunities. Entrepreneurial assistance

organizations should be able to assist in these matters, which are particularly critical in the biosciences due to rapidly changing technologies and rapidly developing markets.

- **Regulatory Support.** Due to the need for FDA/USDA and other governmental approvals dependent on which markets a bioscience entrepreneur is entering, having guidance, advice and counsel on these matters is extremely important to bioscience entrepreneurs.
- **Access to University Researchers.** Bioscience firms require scientific and technical collaboration to be successful which is why so many desire to be near and want to partner with academic health centers, universities and other research organizations. Identifying sources of expertise as well as unique equipment is extremely important to the success of these entrepreneurs and something entrepreneurial assistance units might provide.

These nine areas represent what the Entrepreneurial Assistance Work Group considers to be priority areas in which additional specialty support is needed for bioscience entrepreneurs. Some of these services might be provided by existing entrepreneurial organizations now and in the future. Over time, however, an evolving scenario is to focus these efforts through one common effort statewide but with service delivery decentralized through components in Flagstaff, Phoenix, and Tucson, and with existing entrepreneurial assistance organizations linked to and having access to these specialized services.

RECOMMENDED ACTIONS IN ENTREPRENEURIAL ASSISTANCE

The Entrepreneurial Assistance Work Group noted a number of efforts underway, but not yet completed, to address various elements in what would make up a comprehensive in-depth entrepreneurial assistance support system in Arizona for bioscience entrepreneurs. Because some of these items remain in flux, the Work Group felt that the best approach was to offer a short-term set of more immediate actions, given the state's financial constraints, while suggesting an evolving, more ideal long-term approach.

Immediate and Short Term Approach: A Biosciences Circuit-Rider Serial Entrepreneur-in-Residence

In the interim, until sufficient funding can be obtained to put in place a multi-regional delivery system, it is suggested that a “**biosciences circuit rider serial entrepreneur in residence**” be hired to serve all regions of the state.

The missing gap in building the state's critical mass of bioscience firms can at least partially be addressed. One approach is to hire a person on a full time basis that has the knowledge and experience of starting, growing and developing one or more bioscience firms, both successfully and unsuccessfully. This person would move across the major regions of the state, focusing at any one time on a select number of firms (likely no more than 3-4 firms), helping them build their management team, identify and access capital, address key marketing, regulatory and other challenges, as well as other services and support as identified earlier in this report. Because existing organizations cannot afford to

hire a person with the kinds of knowledge and experience mentioned, the growth of this critical mass of firms is being hampered. By pooling resources across the state and its regions a person with this knowledge can be recruited and hired, probably for up to a three- to five-year period, until such time as the proposed long term approach outlined below can be put into place.

This individual would travel among all regions of the state, offering business mentoring and counseling. One likely approach is to house this person, on his or her “ride”, in each region at that region’s incubator facility if it has one. Both Flagstaff and Tucson have such locations; one is developing around the efforts of ASU for Phoenix. It makes sense in the interim to focus around the research universities and their incubator facilities because this increases the in-depth nature of what they can offer bioscience entrepreneurs and it is where entrepreneurs will likely be attracted in the biosciences, with the exception of medical devices. Business service providers working with the circuit rider might also consider using the same facilities to offer services in tandem with the circuit rider. This circuit rider will work with all existing entrepreneurial assistance groups and organizations and serve as a resource to them in the biosciences.

The Circuit Rider will provide one-on-one entrepreneurial support in a majority of the services identified earlier and where the Rider does not have such skills, private consultants would be hired to supplement his or her skills. The Rider is to provide in-depth help to a select number of bioscience firms; consequently he or she will work with no more than 8-16 firms per year and no more than 3-5 firms at any one time. Candidate firms with which the Circuit Rider would work might come from venture and angel investors, other financial institutions, existing firms, technology groups and organizations and entrepreneurship provider organizations including, but not limited to, those listed in Appendix B of this report.

The Circuit Rider would refer more general needs and support requests to these existing entrepreneurial providers. He or she would be provided office space from which to work when rotating to each region, possibly at university and/or entrepreneur assistance organization. The governing board for this program, made up of funders from each region of the state as well as statewide will approve criteria for choosing firms applying for entrepreneurial assistance. Possible criteria might include leveraged regional resources to insure local financial support, market potential of firm and its products, management team experience, and potential of the firm to attract private equity funds.

This program would be supported in two ways: (1) by leveraging regional private and public resources in each region; (2) securing match with statewide private, public and philanthropic sources. Funding would need to be raised in total of \$300,000-350,000 per year to support the entrepreneurial assistance function (not including financing of a prototype development fund or a BioSeed Fund). This funding would be used as follows:

- Staffing (including Circuit Rider, support staff and consultants) \$235,000 – 285,000
- Travel \$15,000
- Other operating support \$50,000

Guiding Principles for Design of a Circuit-Rider Biosciences Serial Entrepreneur Effort

- Provides one-on-one entrepreneurial support in a majority of the services identified earlier.
- Consultants hired to provide skills not strength of Circuit Rider.
- Focuses on 8-16 firms per year.
- Coordinates work by finding leads from capital sources, existing firms, technology groups and organizations, and entrepreneurial providers.
- Refers more general needs and support to existing entrepreneurial providers.
- Provided office space from which to work when rotates into each region, possibly at university and/or entrepreneur assistance organization.
- Funded through leveraging of regional private and public resources in each region matched with statewide private, public and philanthropic sources.
- Funders make up board of directors and approve firms for assistance and monitor activities under a performance contract arrangement with Circuit Rider.
- Criteria for assistance to firms should include leveraged regional resources to insure local financial support, market potential of firm and its products, management team experience, potential to attract private equity funds.

LONG TERM SUGGESTED APPROACH: A STATEWIDE AZBIOCOLLABORATIVE

The proposed Circuit Rider Biosciences Serial Entrepreneur can begin to establish the foundation of activities that will evolve into a longer-term approach, for example, forming a statewide group called (for reference purposes) AZBIOCollaborative. This organization could be a formal or informal group but should be formally affiliated with all existing entrepreneurial groups and/or be a unit attached to one of these organizations. AZBIOCollaborative would have both a statewide and regional presence. It would have a small core cadre staff of seasoned experience entrepreneurial managers with backgrounds in management, finance, business development and marketing, or regulatory affairs. Unlike the Circuit Rider funding, the AZBIOCollaborative would be financed partially by co-locating with it the management of a BioSeed Fund and/or the Commercial Prototype Development/Proof of Concept Fund (see capital formation Work Group report) as well as provide business mentoring/coaching and some of the nine gaps in services identified earlier.

The closest model to what is proposed for Arizona is a hybrid of the Oklahoma Technology Commercialization Center and the St. Louis Proof of Concept/Pre-Seed Fund, with the specific proposal described in Table 2 below:

Table 2: Proposed Model for Arizona

Element	Oklahoma Technology Commercialization Center	St. Louis Proof of Concept/Pre-Seed Fund	Proposed Arizona Model
State/Regional Organization	Has statewide office serving one metro area and separate office serving other regions linked by high speed broadband communications	One office serving one metro area	Statewide formal or informal organization with at least two offices covering three spokes along bioscience corridor
Staffing	5 FTE	2 FTE plus consultants	2 per office plus consultants
Funding	\$1 million operations (state) plus \$1 million state annual grant to Pre-Seed Fund	\$6 million over five years including foundations (\$3 m) and state tax credits of \$3 million	\$300–400,000 per office or \$600-800,000 rising to \$900,000 to \$1.1 million
Key Functions Performed:	SBIR, patent protection, access to capital, business planning/mentoring, team formation, market and technology assessments, access to university (emerging); building angel networks	SBIR, patent protection, access to capital, business planning/mentoring, prototype development, team formation, market and technology assessments, access to university	All, plus regulatory support, BioSeed Fund and Prototype Development Fund
Linkage to Universities	More recent vintage	Built with strong university interest and support	Affiliated partner and/or host

Key issues to be considered in establishing AZBIOCollaborative include:

- Possible Sources of funding:** Because the state has no or limited dollars; universities are establishing their own vehicles; this leaves the private and philanthropic communities as likely funding sources. Not only would operating funds for entrepreneurial assistance need to be raised but also a BioSeed Fund fundraising effort as well as fundraising for the Prototype Development Fund must be undertaken.
- Insuring Accountability:** While a pure ROI cannot be designed for this operating support other measures of success must be included including targets for firm formation and survival; capital leveraged; products, licenses and sales thereof.
- Linking Organizations:** Either the Circuit Rider and AZBIOCollaborative could be attached to existing affiliated organizations or a new organization created. The Work Group strongly preferred working with and affiliating these efforts with existing organizations whether they be chambers, bioscience cluster organizations, or other technology commercialization organizations.

The advantages to Arizona by development of this long-term solution include:

- A cadre of experienced and qualified staff in the biosciences would be available throughout the state.
- Referral will not be the operating style; rather the model is intensive help to a few bioscience firms at any one time.
- By having this organization also operate two of the other *Arizona's Bioscience Roadmap* actions—BioSeed Fund and Prototype Development—along with the same organization offering in-depth entrepreneurial assistance and assistance on the SBIR program—puts related Roadmap actions and resulting economies of scale and integrated service delivery into one group.
- This will position Arizona to provide one stop shopping for biosciences entrepreneurs.
- Finally, ongoing costs of operation are substantially addressed. Having the core staff handle entrepreneurial assistance, a BioSeed Fund, and a Prototype Development function, all within one group, achieves greater self-sufficiency.

SUMMARY AND CONCLUSIONS

Arizona must develop a more comprehensive, in-depth set of entrepreneurial assistance services to help build a larger critical mass of biosciences firms quicker. The Work Group has identified the most critical services needed by bioscience entrepreneurs and made suggestions in the short term to establish a serial entrepreneur circuit rider and in the long term to establish the AZBioEnterprise to address this important area. These recommendations can address four of the 19 actions contained in *Arizona's Bioscience Roadmap* in the long term (entrepreneurial support, SBIR, prototype development and BioSeed Fund).

**Appendix A:
Membership of Entrepreneurship
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**Appendix B:
Profiles of Existing Entrepreneurship
Assistance Organizations**

Outlined below are short summaries of the activities and services provided by many entrepreneurial assistance organizations in Arizona. We have only listed education and non-profit groups in order to insure fairness to all for profit providers. Since we did not have information on all, we did not list any. Not all education and nonprofit *providers* are listed if the survey returned did not provide enough information.

ASU Technopolis Program and ASU Technology Enterprises, LLC

Representatives of ASU discussed various announced and conceptual efforts underway that involve improving their technology transfer functions, increasing support for entrepreneurial education, and encouraging technology commercialization. One or more of these functions may not be directly operated by ASU but work closely with it. These efforts involve ASU's stimulation and support of technology-focused business development in the region by providing a variety of programs, services, and information. To the extent feasible, ASU desires local partners in the region and will work with local providers of professional support to new business ventures located in cities, state and regional economic development organizations. Activities range from technology transfer and commercialization and related support and assistance to entrepreneurial education and training.

Arizona Bioindustry Association

The Arizona Bioindustry Association is primarily focused on serving as a statewide networking and member services organization for the various segments of the biosciences industries. It is expanding its activities and events to address the critical needs facing these firms.

Arizona Center for Innovation at the University of Arizona Science and Technology Park

The University of Arizona is expanding its efforts in entrepreneurial assistance and support. The UofA Science & Technology Park's incubator has been reorganized and will offer limited wet lab space for biosciences firms. The Arizona Innovation Center will link its career services, procurement, and College of Business faculty support to these efforts. It will provide support for firms to link to university faculty and resources and plans are being developed to consider accelerator space and a prototype development fund.

Other organizations not active in the Work Group but whose programs relate to its efforts include the Enterprise Network, a networking organization that offers forums and hosts the Arizona Angel Network; and TiE-Arizona, the local chapter of an international organization established to encourage technology-based entrepreneurship among East Indians.

Arizona Department of Commerce

The Department has a biosciences cluster liaison working primarily with firms growing and expanding in the state or being recruited to the state. The Department did receive Federal funding in 2003 to offer an expanded set of seminars and small grants to encourage Arizona firms to participate more actively in the Federal SBIR program and be more successful in winning awards.

Arizona Technology Council

The Technology Council includes information technology, environmental and other technology firms in its membership. It serves as an advocate for all technology industries; offers networking, education and other events; and offers seminars, workshops and recognizes entrepreneurship through annual award recognitions.

BIO- SA (Bioindustry Organization of Southern Arizona)

BIO-SA is the southern Arizona high tech cluster representing the bioindustry and is a member of the Southern Arizona Technology Council. The BIO-SA offers regular networking events and meetings. It offers workshops on various topics throughout the year; and on an individual basis offers case by case help through its volunteer Board in areas such as facilitating job placements; problems in working with the university such as federal constraints, legal liability, faculty identification and identification of university expertise and resources. It serves as an interface with the University of Arizona; makes members aware of and sponsors education and training opportunities. It also works with other industry clusters

City of Phoenix Community and Economic Development Department

The City of Phoenix has several generic programs relating to entrepreneurship. It offers a new market tax credits program. Phoenix is focusing this Federal supported effort in three areas: business development and revitalization; venture capital; and small business finance programs. A second effort is its Small Business Management Technical Assistance Program. This program is primarily for existing firms and offers them the opportunity to hire consultants and other expertise to solve specific problems of that firm. Consultants can help a firm develop a marketing plan; setting up an accounting system; planning employee benefits; developing a strategic business plan; etc. Phoenix also provides information and referral services, job recruitment assistance and related support in workforce development. The City offers education and networking opportunities for small businesses. And it has a Resource Center of materials helpful to those operating a business in the City.

Greater Flagstaff Economic Council

GFEC can assist firms with selecting a site; inform firms of tools and incentives, regulatory processes, and business resources available. They can also assist firms in locating the skilled employees they need. Bioindustry is one of three areas targeted for recruitment efforts.

Greater Phoenix Chamber of Commerce

The Chamber provides general support for entrepreneurs through such efforts as the Arizona Venture Capital Conference, outreach to national venture sources, offers a “boot camp” for entrepreneurs program, a two-day Entrepreneurial University set of classes, an Investors Workshop, and related seminars and workshops such as “Get Ready” seminars efforts. In the coming year they are adding mentoring assistance for a select group of entrepreneurs over a six to nine month period, working with experts in and outside the state.

Northern Arizona Technology and Business Incubator

NATBI connects its client firms (incubator without walls currently) with various service providers for such services as intellectual property and other areas. For each of its client firms it forms an advisory council drawn from the local community with necessary expertise. NATBI also uses resources such as NAU students and faculty to complete product development. They help clients locate pre-seed and seed capital; worked with Arizona Department of Commerce on SBIR support; help clients finalized and refine their business plans; sales and marketing plans; introduces them to sources of capital; find key employees; helped form the Forest Angels Investment Network; and related activities. They have done boot camps and have plans for a permanent incubator on the NAU campus.

Maricopa County Small Business Development Center

This is part of Arizona’s network of SBDCs located in each of the state’s ten community college districts. The Maricopa Community College Small Business Development Center provides one on one counseling; referral to service providers and other organizations, and seminars and workshops. Assistance includes business planning, sources of capital, financial and accounting, government procurement, and marketing and sales. Clients include small and medium sized firms, startup businesses, and individuals with a business concept needing assistance in starting. Specialized support has been provided from time to time through third party consultants and special programs. Support is also provided in conjunction with the Arizona Department of Commerce for SBIR assistance. Its general business counseling has included patent, trademark, copyright issues; strategy; capital formation; SBIR; business plans; and marketing plans. They have helped two research and testing and eight medical device firms in such areas as commercialization strategies, IP issues, and capital formation.

Southern Arizona Technology Council

SATC was established to foster high technology firm development, growth and competitiveness in Tucson, Pima County and southern Arizona. Within its purview are six sectors, including the Southern Arizona Biotechnology Cluster. Among other activities of the Technology Council, it has established a training institute, has been active in supplier network development, and helped link U of A to various business and other groups and organizations. A pending funding proposal for a Technology Development Center represent a potential funding source that might be used to help expand its entrepreneurial assistance efforts. The TDC will offer technology development services to small and mid-sized firms that have proven technologies and offer education/training opportunities for Native Americans.

**Appendix C:
Job Description
Biosciences Serial Entrepreneur in Residence**

JOB DESCRIPTION

Position Description

The Biosciences Circuit Rider Serial Entrepreneur in Residence will provide in-depth help, support and assistance to a select number of new and startup biosciences firms throughout the State of Arizona each year. His or her assistance will include assisting firms in forming their management teams, accessing capital, forming marketing strategies, assessing their technologies, regulatory guidance, accessing sources of R & D talent and intellectual property, business planning, prototype development guidance, and related coaching and mentoring support. The Circuit Rider will provide one-on-one support to a select number of biosciences firms at any one time, and will be expected to utilize and work closely with other entrepreneurial assistance groups and organizations in Arizona. The Circuit Rider will focus on those business support areas where there is a lack of existing expertise in existing entrepreneurial assistance organizations and exclusively on biosciences firms. More general entrepreneur needs will be referred to these provider organizations.

The Biosciences Circuit Rider Serial Entrepreneur in Residence will have access to office space from which to provide support and assistance in Flagstaff, Phoenix, and Tucson. While residing in one of these communities, this person will be expected to commute among these three cities frequently and continuously. Because funding will be provided both statewide and regionally, the Circuit Rider will need to maintain a balanced portfolio of assistance to entrepreneurs throughout the State.

The Biosciences Circuit Rider Serial Entrepreneur in Residence will report to a Board of Directors made up of representatives from entrepreneurial assistance groups and organizations, the state's three public research universities, economic development groups, venture capital and other financial providers, as well as representation from those philanthropic, private and public sources that underwrite the Circuit Rider's annual budget.

Duties

The Biosciences Circuit Rider Serial Entrepreneur in Residence duties include:

1. Offering assistance and support in and among nine business areas or functions, including SBIR support, patent protection, access to capital, business planning/mentoring, prototype development, team formation support, market and technology assessments, regulatory support, and access to researchers. A fuller description of these services is contained in the full report.
2. Select and manage a select portfolio of new and startup firms for which assistance is provided, based on an established set of criteria for firm selection, ongoing support, as well as service exiting, approved by the Board of Directors.

3. Coordinate and work with other entrepreneurial assistance groups in the state including those listed in Appendices A & B in terms of firm referrals and in terms of identifying and filling gaps in services.
4. Identify issues and problems facing biosciences entrepreneurs and raising these issues with the Biosciences Steering Committee, convened by the Flinn Foundation.
5. Other activities as necessary to insure an increased birthrate of new biosciences firms in Arizona and their survival and growth.

Minimal Qualifications

The person holding the position of Biosciences Circuit Rider Serial Entrepreneur in Residence is expected to have considerable experience in the development and management of new and startup biosciences firms, including both those that have been successful and those that have not. This person is to have held one or more senior management positions as CEO, CTO, COO, or key regulatory, marketing, and business development functions in several bioscience firms. Preference is to be given to those with direct operating responsibilities, at various life cycle stages of bioscience firm evolution, from conceptualization through research and into direct product markets.

Terms of Employment

The Biosciences Circuit Rider Serial Entrepreneur in Residence is expected to be employed on a multi-year performance contract with performance criteria established by the Board of Directors prior to initial recruitment and hiring. Performance criteria will include biosciences firm growth, survival, and success in securing external capital, progress in product development and market introduction, and related measures.