
Preliminary Recommendations

Capital Formation/Incentives Work Group



PREPARED FOR:
The Flinn Foundation

PREPARED BY:
Technology Partnership Practice
Battelle Memorial Institute
Cleveland, Ohio

Arizona Capital Formation/Incentives 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 this Roadmap.

In early 2003, 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 were those related to financing biosciences firms (capital formation/incentives), facilities for biosciences firms; and entrepreneurial support in the formation of biosciences firms. This report discusses the deliberations of the Capital Formation/Incentives Work Group and the suggested actions to move forward in the short and long term.

Quinn Williams, Esq., of the firm Greenberg Traurig, LLP, and James M. Strickland, General Partner, Coronado Venture Management co-chaired this Work Group. Additional staff support was provided to the Work Group by Saundra Johnson, Associate Director of 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 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 form the capital base necessary to finance the startup enterprises that will commercialize the research. The Arizona Roadmap suggested ways must be found to secure funding at the earliest stages of bioscience firm formation through creation of an Arizona BioSeed Fund. This Fund would focus on investing in Arizona-based bioscience deals in the \$200,000 to \$2,000,000 level. This is generally considered for biosciences to capture the pre-seed to seed stages of investments and was identified as Arizona's most critical, but not only, capital gap. Data presented by Battelle showed Arizona's most critical deficit was in the area of biologics/pharmaceuticals. In addition to the BioSeed Fund the Roadmap also suggested the need to establish a Prototype Development and Proof of Concept Fund for moving research towards commercialization.

The *Arizona's Bioscience Roadmap* pointed out that Arizona must have an indigenous venture capital base for biosciences if it is to leverage outside later stage venture investments. Other points regarding capital formation made in the Roadmap included reference to the track record of other regions where the same firms made investments in both biosciences and information technology; the result was usually to under-invest in biosciences because of its longer lead times, greater burn rate, and perceived riskier

investment opportunities. However, in the case of devices and bioinformatics IT-focused venture firms would be a good fit with these kinds of firms. As Arizona builds its critical mass of bioscience firms it will also have to address later stage financing. The Roadmap recommended creation of a BioSeed Fund and review of the state's tax code to support the growth, expansion and selective recruitment of bioscience firms.

The work group investigated three interrelated but distinct questions:

Arizona's R&D tax credit and whether it could be made friendlier to small and medium-sized enterprises.

How a venture-investment tax credit could be designed so as to encourage creation of early-stage investment vehicles.

How a "fund of funds" could be put in place to allow institutional investors to pool their investments so as to achieve venture-class returns while focusing geographically on Arizona.

The balance of this white paper offers observations on national best-practice in each of these three areas, followed by recommendations for Arizona, again in each category.

WORK GROUP DISCUSSIONS AND DELIBERATIONS

The Capital Formation/Incentives Work Group met four times to review intermediate drafts of this white paper. At the initial meeting Battelle reviewed best practices in capital formation for bioscience firms around the country. At the second meeting Battelle presented a review of Arizona's current R & D tax credit as well as proposed a framework of actions to address the entire life cycle of financing needs facing bioscience firms. At the third meeting these actions were further refined and agreement reached on conclusions. Members of the Work Group noted that it may be some time before spin-offs from the bioscience initiative reach critical mass, and so incentives need to be designed which are friendly to all nature of startups and also to relocations. It would appear that the efforts to implement *Arizona's Bioscience Roadmap* regarding capital formation and incentives are to address three key areas:

- Encourage private investors to increase capital available for Arizona-based bioscience enterprises.
- Increase the size and number of venture funds located and investing in Arizona bioscience deals.
- Encourage more university/industry partnerships through tax incentives and other means to insure research turns into commercial products and/or health care treatment/prevention.

BACKGROUND AND COMPARATIVE BEST PRACTICE

In this section of this paper we discuss three areas – R & D tax credits, venture investment credits, and funds of funds – as three action areas that can address achieving the objectives set out in the previous section. The Work Group concluded that proposals

around these three areas would best capture what the *Arizona's Bioscience Roadmap* suggested needed to be addressed in capital formation/incentives:

R&D Tax Credit

Most states that have R&D tax credits – and a majority do – build upon the definitions and requirements of the Internal Revenue Code (IRC) Section 41.1 In evaluating national best practice, it makes sense to consider the elements of the credit in terms of easily adjustable parameters, as below.

Volume vs. Incremental

IRC Section 41 allows a credit on *incremental* R&D expenses as opposed to a *volume* credit on all R&D. One excellent analysis provided to the Work Group² argues that incremental credits are far more efficient because they avoid the deadweight economic loss of compensating companies for R&D that they would have financed in any case. Only a few states deviate from the federal approach. For example, Illinois offers a 6.5 percent volume credit on research conducted in Illinois.³

Definition of Qualified Research Expenses

Most states with R&D tax credits follow the definition of qualified research expenses found in IRC Section 41 (with the proviso that qualified research expenses must be made in-state). As in other aspects of a state-level credit, copying the federal definition offers companies some valuable simplicity in bookkeeping and documentation requirements. While critics of the federal definition complain that there is too broad a divergence (possibly as much as 35 percent)⁴ between the “book” or GAAP⁵ definition of R&D and the “tax” definition of IRC Section 41, this seems to be a reasonably well settled issue at the national level and in most states, at least in the biosciences.⁶

Definition of Base Amount and Fixed-Base Percentage

In defining the “base amount” over which the credit on incremental qualified expenses is granted most states again follow IRC Section 41, which defines it as the amount that the company would have spent had it applied to a four-year rolling average of sales revenues the same percentage of sales it spent on qualified research during a “fixed-base period” (1983-1989, under federal law). There is considerable debate at the federal and even international levels over the proper definition of the base amount. The general consensus is that this sales-indexed approach avoids perverse incentives that arise in other obvious

¹ Formally, U.S. Code Title 26, Subtitle A, Chapter 1, Subchapter A, Part IV, Subpart D, Section 41.

² Nicholas Bloom, Rachel Griffith and Alexander Klemm. *Issues in the design and Implementation of an R&D Tax Credit for UK Firms*. London: Institute for Fiscal Studies, Briefing Note No. 15, January 2001. Available on-line at <http://www.ifs.org.uk>.

³ See Part VI of the tax form Schedule 1299-D, available on-line at: <http://www.revenue.state.il.us/taxforms/incm2001/bus/misc/fl299.pdf>.

⁴ Bronwyn H. Hall, “The Economics of R&D Tax Credits,” Presentation available on-line at <http://emlab.berkeley.edu/users/bhhall/rtaxpolicy01.pdf>.

⁵ Generally Accepted Accounting Principles.

⁶ There is some remaining dissent among IT companies and among those who specialize in incremental product improvement, which is generally ruled out under the federal definition.

alternatives, such increments over a rolling average of recent research expenses. However, some analysts believe the period in which the base percentage is calculated may need to be slowly moved ahead in time, particularly as a transition point for companies that use the phase-in rules that the code provides for startups that did not exist in the base period or otherwise run into technical conflicts with the definition of qualified research. However, this is not an issue on which most states have chosen to differ with the IRS – again, favoring simplicity of implementation over theoretically optimal alternatives.

Federal law also enables an “alternative incremental credit” calculation, which has proven important mostly to defense companies and other firms whose R&D intensity may be shrinking at the same time their sales are rising.⁷ There are also two additional restrictions in the federal code which are adopted implicitly by states favoring the federal approach:

- No matter what the actual percentage of sales accounted for by research during the base period, the “fixed base percentage” is treated as no more than 16 percent. This cap actually favors companies that did a higher percentage in the base period. Some bioscience advocates have suggested lowering the cap to 8 percent to compensate for differences between book and tax definitions of R&D, but this argument does not seem to have gained adherents.
- No matter what is shown by multiplying the fixed-base percentage by a four-year rolling average of revenues, the “base amount” on which the increment is calculated must be considered as at least half the current-year qualified research expense. This cap works against the interests of research-intensive companies as it limits the effective rate of the credit, no matter what the “headline rate” (see below).

Finally, to prevent “double dipping,” the full amount of the credit claimed must be *subtracted* from R&D deductions claimed under Section 174. Not all states with R&D credits follow this rule.

Definition of Basic Research Payments

The federal credit – in addition to recognizing as qualified expenses any contract research to universities or other entities⁸ – grants a specific credit on incremental “basic research payments” to universities, provided they have not been financed by shifting other types of university support.⁹ There are states that “sweeten the pot” in various ways for research expenses placed with in-state universities. For example, several states offer a *separate credit* targeted at donations or grants/contracts with in-state universities, which means they can both be more generous and not be so scrupulous about the definition of basic

⁷ Bronwyn H. Hall, “The Economics of R&D Tax Credits,” Presentation available on-line at <http://emlab.berkeley.edu/users/bhhall/rtaxpolicy01.pdf>.

⁸ Technically, these calculations are adjusted by a factor of .65 for universities and .75 for research consortia, to net out an estimate of overhead not directly related to the research tasks.

⁹ This motivation is discussed in Gary Guenther. “The Research and Experimentation Tax Credit: CRS Issue Brief for Congress.” Number 92039 dated August 10, 1999, and available on-line at <http://www.ncseonline.org/NLE/CRSreports/Science/st-14.cfm?&CFID=7791328&CFTOKEN=38336395>.

research that is built into federal law, allowing them also to recognize support of applied research and other kinds of partnership relationships:

- Arkansas, in addition to its other R&D credit programs,¹⁰ also grants income-tax credits of 33 percent on *all* amounts expended on “qualified research programs”¹¹ at in-state university research programs recognized by the Arkansas Science and Technology Authority. The credit also applies to donations of new equipment, or sale of such below cost. It is capped at 50 percent of the taxpayer’s tax liability after application of all other credits and reductions.
- Connecticut, in addition to its 20 percent incremental R&D credit,¹² also grants a 25 percent credit on grants to universities that exceed a three-year rolling average.¹³ Certain kinds of testing and market research are excluded, and there is no carryforward, carryback, or refundability for the credit.

Other states retain the basic structure of the federal “basic research payments” calculation but offer a higher marginal credit:

- Massachusetts gives a 15 percent credit for incremental in-state basic research, versus 10 percent for other incremental research expenses, otherwise following Internal Revenue Code Section 41.¹⁴
- California gives a 24 percent credit for incremental in-state basic research, versus 15 percent for other incremental research, and with a slightly reduced alternative calculation otherwise follows IRC Section 41.¹⁵

Programs in two Canadian provinces (the federal government offers a 20 percent volume credit) are particularly generous for in-province university research:¹⁶

- Ontario, in addition to its 10 percent refundable Innovation Tax Credit and its “superallowance” deduction at up to 152.5 percent of actual R&D expenses,

¹⁰ Such as a 20 percent incremental credit offered through the Biotechnology Development Act. See <http://www.state.ar.us/dfa/taxes/taxcred/general.html>. There appear to be other, smaller credits available as well.

¹¹ Extensive documentation can be found at http://www.arkansas-scienceandtechnology.org/tax_credit.html.

¹² See Connecticut General Statutes Section 12-217n available at <http://www.cga.state.ct.us/2003/pub/Chap208.htm>.

¹³ See Connecticut General Statutes Section 12-217l available at <http://www.cga.state.ct.us/2003/pub/Chap208.htm>. Also see description at <http://www.drs.state.ct.us/pubs/IP's/1995/ip952-1.html> or Informational Publication 17 available at <http://www.drs.state.ct.us/pubs/IP's/2001/IP01-17.pdf>.

¹⁴ See General Laws of Massachusetts Chapter 63, Section 38M, available on-line at <http://www.state.ma.us/legis/laws/mgl/63-38m.htm>.

¹⁵ Annette Nellen, “Keys to Understanding and Utilizing the Federal and California Research Tax Credits.” Presentation to American Society of Women Accountants Silicon Valley Chapter. Feb. 27, 2001. Available at http://www.cob.sjsu.edu/facstaff/nellen_a/Keys%20to%20Understanding%20and%20Utilizing%20the%20Federal%20and%20California%20Research%20Tax%20Credits.pdf.

¹⁶ An excellent summary of provincial programs appears at the promotional website <http://www.therndteam.com/html2/provincial.htm>. For the Quebec program specifically see [http://www.revenu.gouv.qc.ca/documents/eng/publications/in/in-109-v\(2002-10\).pdf](http://www.revenu.gouv.qc.ca/documents/eng/publications/in/in-109-v(2002-10).pdf). For the Ontario program see <http://www.gov.on.ca/fin/english/tax/2000/tb00e2.pdf>.

- offers a 20 percent refundable credit for research performed at “eligible research institutes” in Ontario.
- Quebec, in addition to its 20 to 40 percent refundable credit on the first \$2 million of R&D wages, offers a 40 percent refundable credit on expenditures pursuant to a research contract with “prescribed centres.”

Rate

The “headline rate”¹⁷ for the federal R&D credit is 20 percent, but the effective rate is reduced by several of the caps and restrictions in federal law as noted above. The same caveat applies, of course, to all states whose credits build on the federal definitions. There is no current survey of the current rates offered by the 35 or so states offering R&D credits. A good, current survey of international rates and terms has been published this year by PriceWaterhouseCoopers (UK).¹⁸ Some comparative material has also been published by the federal agency Statistics Canada, proposing that one should not compare the nominal credit rates but rather the before-tax income required to break even on an incremental dollar of R&D outlay.¹⁹ The paper proposes as a best practice a “B-index” methodology that is used widely in Canada and Europe to make cross-jurisdictional comparisons, including with certain U.S. states.

Cap

States adopt a variety of ways to cap their exposures to the credit. While it is not clear there is a best practice, there are some very undesirable caps. For example, Pennsylvania caps the total credit which can be claimed statewide and therefore must prorate taxpayer claims.²⁰

Expiration

Probably the single most contentious issue in the realm of the federal credit is its continually rolling sunsets, which mean that it must be renewed (and on occasion it has not been renewed, producing gaps in its coverage). Aggressive states such as California have made their credits “permanent” (indefinite, actually).

Carry-forward

The federal credit may be carried forward 15 years, if the taxpayer does not have tax liability against which it can be applied, and this is a provision recommended by BIO as a best practice at the state level. Many states, for example North Carolina, have a less-favorable five-year carryforward.

¹⁷ This is the term used by Bloom *et al.*, *op cit.*

¹⁸ PriceWaterhouseCoopers (UK). “Tax Incentives – a Way to Stimulate R&D and Innovation.” Available on-line at http://www.pwcglobal.com/gx/eng/ins-sol/publ/ipvalue/pwc_12.pdf.

¹⁹ See Jacek Warda. *Measuring the Attractiveness of R&D Tax Incentives: Canada and Major Industrial Countries*. Ottawa: Statistics Canada, December 1999. Report ST-99-10. Available on-line at http://collection.nlc-bnc.ca/100/200/301/statcan/science_innovation88f0006-e/1999/no010/88F0006XIB99010.pdf.

²⁰ See application form at http://www.revenue.state.pa.us/revenue/lib/revenue/2002_rev-545.pdf or testimony of the Pittsburgh Technology Council at <http://www.pghtech.org/advocacy/testimony.html>.

Refundability

Another issue that comes up repeatedly at the federal level is whether credits that cannot be used either in the current year or during the carryforward period can be refunded or sold at some point before they expire. Federal law does not offer this feature, but some aggressive states do:

- New Jersey allows defined classes of high-tech companies with fewer than 225 employees to sell their unused R&D credits and NOLs for at least 75 percent of value to another company with New Jersey tax liability. The program is capped, and so the sales are prorated according to demand.²¹
- Connecticut allows firms to claim a 65 percent refund on otherwise-unusable R&D credits, or else carry them forward.²²
- Hawaii allows full refundability on the R&D credit (although this provision is threatened under current budget strictures), and unused NOLs can be sold to other firms for at least 75 percent of their value.²³

The Work Group concluded that some targeted changes might be suggested to encourage more private sector-university partnering in research and development. The specifics of this recommendation will be addressed in the concluding portions of the paper.

Venture Investment Credits

A number of states have granted tax credits to individual or corporate investors who place their assets in approved or designated types of venture-capital funds that are based in-state. These programs can be thought of as similar to CAPCOs,²⁴ but much more efficient and effective because (a) the credit is usually not 1:1, so state-provided resources are levered by private assets that are substantially at risk; (b) all funds raised can be invested rather than some sequestered in zero-coupon instruments; and (c) there is an explicit attempt to change permanently the equity risk thresholds of existing, local investors and to leave behind an infrastructure of skilled, private-sector managers of early-stage venture capital funds. Like CAPCOs, these programs make no provision for the state to achieve a “return” on the value of the credits granted; rather, the return is assumed to come in the form of increased, taxable economic activity.

Taxpayer Classes Eligible

In states with personal income taxes, it is usually sensible to make such a credit available to the individual taxpayer. There are some corporate taxpayers that invest in venture-class equities for their own accounts, but not many: most are actually investing on behalf of other entities, many of which are both tax-exempt (and thus immune to credits) or restricted to fixed-income securities or both.

²¹ See http://www.njeda.com/program_tax.htm.

²² See <http://www.drs.state.ct.us/pubs/IP's/2001/ip01-17.html>.

²³ See http://www.state.hi.us/tax/temp/hi_tech_ppt.pdf.

²⁴ Certified Capital Companies.

Credit Rate – and Exceptions

The programs surveyed by Battelle offered credit rates ranging from 6 percent (the Iowa credit targeted at corporate taxpayers) to 100 percent (the Missouri credit to both individual and corporate taxpayers that resulted in the creation of Prolog Ventures). Most clustered in the range of 20 percent to 50 percent. There appears to be no body of economic literature on what rate of subsidy would be the most efficient in changing investor behavior for the least cost, and so the choice is mainly arbitrary (although a higher credit presumably must be combined with a lower cap in order to limit the state's budgetary exposure.)

Credit Cap and Timing

State fiscal exposure can be capped either per investment, per taxpayer, per investee fund, per year in total, or in some combination of all these ways. Per-year total caps require some scheme for allocating the credit – either by prorating all eligible claims in a given year (which probably presents too many uncertainties to the potential investor to be useful) or by granting credits on a first-come, first-served basis (which may work better if the investor knows in advance that they will get in under the annual cap). Some states additionally require a lag between the time the investment is made and the time the credit can be claimed.

Fund Size and Exceptions

The purpose of such credits is to build infrastructure in that segment of the venture market that is lacking local sources of investment, local sources of management, or both. In most areas of the country outside the major coastal financial centers, that means early-stage and seed-stage funds. Therefore, the criteria for fund eligibility often favor this class of funds. Seed-stage funds typically must be somewhat over \$10-15 million in size in order for the standard manager's fee to cover the salary of a qualified manager plus office and overhead expenses. On the other hand, seed stage funds must not get too large, because then the pressure to put money to work fast results in larger (and inevitably later-stage) deals getting done. Consequently, the Work Group felt a continuum of funds needs to be encouraged from funds in the \$3-5 million to funds 20 to 30 fold larger.

Just as there can be exceptions to the general credit rate, it may make sense to relax the size requirement – possibly to promote the formation of a network of small-scale funds outside the major cities. For example, Iowa is specifically promoting the use of its 20 percent seed capital credit to formation of much smaller “community” seed funds in the range of \$500,000 to \$3 million in capital. Some general partners will prefer to work in the small-community milieu, and they may find ready pools of investors nearby. While a small fund cannot support the salary of a professional manager and general office overhead, there are examples of networks of small funds in mutual-assistance networks (see appendix).

The Work Group identified a series of ways to encourage individual private investments in venture funds based on the above discussion which are contained in the ending sections of this paper.

Funds of Funds

Most communities that want to build a base of locally managed venture-capital funds seek to leverage local sources of institutional capital such as pension funds (both public and private), university and foundation endowments, and extremely wealthy individuals or family “offices. However, in many cases, these local investors may have little exposure to venture capital as an asset class, either because they are relatively small or relatively inexperienced in this kind of investing or both. They are not well equipped to research the thousands of venture partnerships around the nation, and certainly not comfortable narrowing the field to those venture funds that are based locally. Therefore, when such investors do place assets in venture capital, they do so from a broadly diversified, national basis. Typically they rely on a “gatekeeper” or other consultant based in one of the nation’s financial centers. These consultants have no loyalty to their own region, and no reason at all to propose the loss of diversification that comes from narrowing the geography of interest.

It is possible to address this problem by creating a “fund of funds” focused on the region of interest. A fund of funds is not necessarily a creature of the public sector. In fact, the mechanism is used frequently in the private sector to help relatively small investors diversify against risk in asset classes where their small size does not permit them to do the necessary due diligence, or with the necessary analytical distance. However, some trusted and experienced third party can do this on behalf of a large group of institutional investors, each of whom has contributed just *a small share* of the small share allocated to venture capital in the first place. Sometimes a fund of funds is offered as an unregulated hedge fund (usually with no geographic focus), and in other cases it is operated by a heavily regulated, SEC-Registered Investment Adviser (RIA). There are examples elsewhere in the nation (Cincinnati, for example) of RIAs operating funds of funds which have at least some level of geographic focus. One advantage of operating a fund of funds in the private sector is that the manager can attract capital from outside the region, too, in effect leveraging the local institutional base at the fund-of-funds level.²⁵

As an alternative, state government sometimes invests its own funds from whatever source in a diversified pool of venture funds with in-state offices, as is done by the New Mexico State Investment Council through its “New Mexico Venture Capital Program.”²⁶ However, without private, profit-motivated investors standing side by side with the state and at risk of losing their own money, the process can become fraught with interference and may make serious mistakes. The alternative way is to *publicly* charter a fund-of-funds. That is actually the path chosen by those states like Oklahoma that have used the “contingent tax credit” method of fund-raising, but a tax credit is not the only possible way of capitalizing a fund of funds.

²⁵ However, to be effective at the latter, they have to be prepared also to place capital outside the state when that is appropriate.

²⁶ See <http://www.state.nm.us/nmsic/02invest.htm#alternative>.

The Maryland VC Trust Model

A useful model to begin to understand is The Maryland Venture Capital Trust.²⁷ It is created under law as a public instrumentality governed by seven trustees appointed by the Governor on advice and consent of the state Senate and required to have certain skills and to represent at least in part the “participating investors.” The trust was empowered to solicit participating investments “from any source including not more than \$2 million in appropriations” and limited to no more than \$15 million from the state retirement and pension system (which was not legally required to invest). Other than that, the trust was free to solicit investments from other sources. In the end it achieved a pool of \$19.1 million composed of these two sources plus \$2.1 million from public pension funds associated with the City of Baltimore. In theory, if the deal had been sufficiently attractive, there is no reason the trust could not have solicited and received investment from private-sector pensions or institutional endowments, although this did not in fact happen.

Notably, the trust was given the power to negotiate terms with its investee venture funds, and was charged to *prefer* investing in venture funds that:

- “conduct a substantial amount of business in the state.”
- “match the money invested by the Trust with money invested by private investors in at least a 1:3 ratio.”
- “ensure that a majority of the money invested by the Trust be for seed-capital financing in Maryland.”²⁸

The first two preferences were enforced through issuance of RFPs and the latter through informal side agreements with the investee funds. It is widely believed that the investee funds which agreed to open offices in Maryland ended up attracting so many other outside investors *at the fund level* that they were able to easily exceed this latter requirement even though they also made investments outside Maryland.

According to the most recent on-line report, the trust is now fully invested in eight venture partnerships, including several that were new to the region when the program began and have since become large and important actors in the region:

- Catalyst Ventures (\$3 million) based in Maryland.
- Oxford Bioscience Partners (\$3 million) based in Boston but active in Maryland.
- Edison Venture Fund III (\$3 million) based in New Jersey but active in Mid-Atlantic.
- GroTech Partners IV (\$3 million) based in Maryland.
- Calvert Social Venture Partners (\$2 million) based in Maryland.

²⁷ Maryland Code Article 83A Sections 5-301 through 5-309, available on-line at <http://198.187.128.12/maryland/lpext.dll?f=templates&fn=fs-search.htm>. For a summary see <http://www.mdarchives.state.md.us/msa/mdmanual/25ind/html/76vent.html>.

²⁸ The law also limited the investments at seed capital stage by investee funds to no more than \$1 million for any one business.

- Kitty Hawk Capital (\$1.6 million) based in North Carolina.
- Tri-Tech Partners (\$1.5 million) based in Maryland.

The Work Group concluded that fund of funds mechanism might be a useful approach for Arizona to consider addressing the varying capital needs, not just of biosciences, but other technology industries as well, modeled in part after Maryland.

ARIZONA’S EXISTING CAPITAL FORMATION AND INCENTIVES

This section reviews the three proposed capital formation interventions in terms of current Arizona law and practice and assesses missing gaps and opportunities.

R&D Tax Credit

Arizona’s R&D tax credit law was recently revised.²⁹ Battelle’s assessment of the current law proceeds along the same organization as our discussion of best practices in state R&D credits discussed above:

Volume vs. Incremental

In following the federal incremental approach, Arizona is fully in the mainstream.

Definition of Qualified Research Expenses

Arizona’s definition of qualified research expenses follows that of IRC Section 41 (with the proviso that qualified research expenses must be made in-state). Again, this is a mainstream choice.

Definition of Base Amount and Fixed-Base Percentage

In defining the “base amount” over which the credit on incremental qualified expenses is granted Arizona legislation again follows IRS Section 41. It should be noted that Arizona law does not provide for an analogue of the federal “alternative incremental credit” calculation (this option is not to be confused with the phase-in rules for startups, which do exist under Arizona law). This omission of an alternative credit does not appear to be greatly unfriendly to small bioscience companies, since the alternative credit is mainly considered important to defense companies and others whose R&D intensity may be shrinking at the same time their sales are rising.³⁰ This is not usually the case for the kind of small, startup firm that Arizona is presently targeting in the biosciences.

²⁹ For the presently effective legislation, see Arizona Revised Statutes 43-1168 available on-line at <http://www.azleg.state.az.us/ars/43/01168.htm>. For the current tax form, see <http://www.revenue.state.az.us/2002/308.pdf> and for instructions on filling it out see <http://www.revenue.state.az.us/2002/308i.pdf>. For comparison, see the instructions pertaining to the form used under previous versions of the law, for example <http://www.revenue.state.az.us/1999/308i.pdf> or www.revenue.state.az.us/96inst/308_i.pdf. As a matter of disclosure, the author of this memorandum is not an attorney or tax specialist; nor has the memorandum been reviewed by any such persons at Battelle.

³⁰ Bronwyn H. Hall, “The Economics of R&D Tax Credits,” Presentation available on-line at <http://emlab.berkeley.edu/users/bhhall/rtaxpolicy01.pdf>.

Definition of Basic Research Payments

Arizona follows the federal definition of basic-research payments, with an in-Arizona restriction. This puts Arizona in the mainstream of states granting R&D credits.

Rate

Arizona's current rate on the first \$2.5 million incremental expenses is 20 percent, but the credit on increments above this level drops to 11 percent. This two tiered structure that drops for *higher* incremental R&D expenditures is difficult to justify under economic theory and probably was intended to limit the state's total exposure. Although the first-tier 20 percent rate is generous by the standards of many American states, tiering may be the single unfriendliest aspect of the Arizona credit, though it replaces a feature even less friendly (a cap).

Cap

Current Arizona law caps the credit at \$2.5 million, which at the 20 percent/11 percent split rate rewards more than \$20 million in incremental R&D. While any cap is not as favorable as no cap, Arizona's method of limiting its fiscal exposure is certainly an improvement in simplicity and substance over the previous cap.³¹

Expiration

Arizona's law has no expiration date, joining the rank of states that have made their credits indefinite.

Carry-forward

Like the federal credit, the current Arizona credit may be carried forward 15 years, if the taxpayer does not have tax liability against which it can be applied. This provision meets the BIO recommendation on this matter. Moreover, Arizona's current credit carryforward represents a substantial improvement in simplicity over the previous statute (and there are still complicated transition rules for periods before January 1, 2001).

Refundability

Arizona does not offer refundability, which could be considered a possibility for improvement.

Summary Assessment and Policy Options

Our overall finding is that the Arizona R&D tax credit is now fully in the mainstream of state R&D credits. It could be improved on the margins but is reasonably aggressive and competitive across the board. To the extent that its provisions are not optimal for the targeted class of firms, that is largely because it is also mainstream, by building upon the definitions and requirements of the IRC. While some improvements could probably be made over federal definitions, they would come at the cost of complexity that would be

³¹ See application form at http://www.revenue.state.pa.us/revenue/lib/revenue/2002_rev-545.pdf or testimony of the Pittsburgh Technology Council at <http://www.pghtech.org/advocacy/testimony.html>.

hard for small firms and their tax advisors to deal with the exception of several small incremental changes outlined in the concluding section of this paper.

Venture Investment Credit

Arizona offers no venture-investment credit currently.

Fund of Funds

Arizona has not employed the “fund of funds” mechanism, however financed.

RECOMMENDED ACTIONS IN CAPITAL FORMATION/INCENTIVES

R&D Tax Credit

Changes to the Arizona R&D tax credits that are both desirable and feasible in terms of not adding a great deal of complexity includes:

Immediate and Short Term: Modifications to Arizona’s R & D Tax Credit

- 1. Adding an enhanced or separate “super credit” for research expenditures pursuant to sponsored-research agreements with an Arizona university, possibly featuring (1) a higher rate; (2) broader definitions that are not limited to basic research and encompass the kind of applied or development research common in partnership arrangements; (3) a volume credit at a generous rate of say 10 percent; or (4) some combination of these enhancements.**

Long Term:

- 2. Altering the two-tier structure of the credit rate so that the incentive does not drop for incrementally higher investments of R&D.**
- 3. Adding some limited refundability of unused credits at some point before expiration of the 15-year carryforward.**

Arizona could gain favorable visibility within the bioscience community by aligning its intergovernmental relations agenda with the recommendations of BIO and others with respect to the federal R&E credit, which drives so much of the Arizona credit on a practical basis.

Venture Investment Credit

Following is a recommended design for a venture-investment tax credit, organized according to the same policy parameters as the best-practice discussion above. The discussion focuses on a portfolio-level credit – that is, one designed to encourage investment in venture capital funds, which creates an enduring private-sector infrastructure, rather than directly in venture-stage companies, which does not.

Taxpayer Classes Eligible

There should be a focus on ways that address the state individual income tax, due to the state's many relatively wealthy residents, both natives and snowbirds, whose investing behavior could be permanently affected by a generous credit against their personal income taxes.

Credit Rate – and Exceptions

As a working proposal, Arizona could start modeling the effects of a 25 percent credit subject to caps and restrictions suggested below. However, it may be desirable to make certain limited exceptions. For example, borrowing from Missouri's approach, Arizona could set aside a fixed amount of credits for allocation at a very high level – say 90 or even 100 percent – to encourage the formation of at least one venture fund that is organized with a chartered commitment to invest at the very earliest stages and only in deals emerging from Arizona's university technology-transfer offices. Another key example would be to encourage investment in a BioSeed Fund and other funds associated with the Fund of Funds (see below).

Credit Cap and Timing

A working model for a credit cap might be:

- Annual cap of \$15 million in credits, authorized for the next three to five years.
- Per-investor cap of \$250,000 in credits annually (at a 25 percent credit,³² that would support annual investment of up to \$1 million per claiming investor).
- Per-investee-fund cap of \$5 million in credits, cumulatively (at a \$15 million total annual cap, that would support up to 5 investors claiming the full credit for investment in the fund).
- Allocation mechanism as described below.
- Extensive carryforward but no refundability.

In an example calculation, \$75 million in tax credits (\$15 million/year x 5 years) could catalyze:

- Private investment of \$300 million directly levered by the credit (\$75 million/25%) plus the potential for out-of-state or other credit-ineligible investments.
- 15 newly created funds with managers who will become skilled in venture financing (\$75 million/\$5 million per fund) of at least \$5 million each.
- 300 investors introduced to venture investing (\$75 million/\$250,000 per credit-eligible investor).

One possible allocation scheme might be:

- Each fund who's offering documents meets the qualifications files and seeks credit authorization as soon as it is ready to accept investment, and a tally is

³² Omitting for simplicity the possibility of a limited but larger credit for extremely early-stage funds.

started of all credits granted for investment in this fund so that the \$5 million per-fund cap can be monitored.

- When a fund closes, participating investors who have actually transferred capital in the closing may seek approval for the credit up to their individual cap.
- If there are more credit claimants than can be supported by \$5 million per fund cap, their claims can be pro-rated proportionately.
- If more funds qualify than can be satisfied by the annual cap, credits can be granted for use in subsequent years until all \$75 million is exhausted.
- If capital is returned without investment, the credit is recaptured.

It should be noted that if proration occurs – as will happen if there is more than \$5 million of credit-eligible investment in a given fund – the effective credit will be less than 25%. One way to avert this outcome would be for fund managers to raise part of their targeted capital base from credit-ineligible investors such as those individuals who exceed their credit cap, or out-of-staters with no local tax liability, for-profit corporations, or nontaxable entities. If this outcome is not satisfactory, alternative cap and allocation rules can be devised.

Fund Size – and Exceptions

The purpose of the credit should be to build infrastructure in that segment of the venture market that is lacking local sources of investment, local sources of management, or both. In most areas of the country outside the major coastal financial centers, that means early-stage and seed-stage funds. Therefore, the criteria for fund eligibility should favor this class of funds. Seed-stage funds typically must be somewhat over \$10-15 million in size in order for the standard manager's fee to cover the salary of a qualified manager plus office and overhead expenses. On the other hand, seed stage funds must not get too large, because then the pressure to put money to work fast results in larger (and inevitably later-stage) deals getting done. (There are other, better ways to build local capacity to support large, later-stage venture funds than an individual tax credit.)

Just as there can be exceptions to the general credit rate, it may make sense to relax the size requirement – possibly to promote the formation of a network of small-scale funds within Arizona. Arizona has had successful experience with smaller funds and such funds have disproportionately helped small, young growing bioscience firms. Therefore there may be good reason to relax the size criterion – say to about \$3-5 million.

And as Arizona builds a critical mass of bioscience firms its investors will be asked to provide more investment dollars and this may require some provision, perhaps at a lower rate, to encourage investments by Arizona investors in mid to later stage funds, necessitating that the investment tax credit take account all stages of the bioscience industry life cycle.

Immediate and Short Term Recommendations: Establishing an Arizona Venture Investment Tax Credit.

It would be reasonable to propose state legislation that would offer an investment tax credit for individuals against their tax liabilities within the state. Such legislation should be designed to ensure the application of the credit is given to those venture-capital funds that have.

- **An Arizona headquarters, with an Arizona-resident general or managing partner.**
- **Capitalization of at least \$3 million to \$15 million and no higher than \$50 million.**
- **Investor base of at least 5 -8 unrelated limited partners, but with no restrictions on where they are from, except that the credit applies only to those with Arizona tax liability, but there is encouragement (see above) to include others in the capital base.**
- **Chartering documents that commit to investment in Arizona-based enterprises, but without restriction on the size of the company or whether or not it has failed to obtain capital elsewhere (a not-uncommon provision, but often implicated in perverse outcomes).**
- **Chartering documents that require focus on the six core competencies identified in Battelle reports (IT, communications, bioengineering, sustainable systems, neurosciences, cancer therapeutics).**

It will be necessary for either the Department of Revenue or some intermediary organization designated under law to assume the responsibility of judging eligibility for the credit (including claims to preferences on rate or exception on the size target) and allocating any annual caps to the credit. In either case, the allocating and judging entity must enjoy or establish a high level of trust in the business community.

Fund of Funds

Immediate and Short Term: Forming an Arizona Fund of Funds

- **Arizona should create a Fund of Funds – administered through what we shall call for convenience the “Strategic Investment Board” – and establish a Arizona BioSeed Fund.**

The purpose of this Board would be to provide an open, transparent, and accountable framework through which capital raised from a variety of public and private sources could be deployed in a diversified manner across a range of professionally managed, private-sector venture capital funds that:

- either are or come to be based in Arizona, thus building the infrastructure of formal venture-capital finance.

- are focused on business and technology sectors of importance to Arizona, such as those identified in the Bioscience Roadmap.
- have as other investors, alongside the fund-of-funds, a range of profit-motivated actors from the private for-profit and non-profit sectors, and from both in and outside the state, assuring market discipline.

This Fund of Funds would be available and formed to invest in all areas of technology, not just biosciences but it would be expected that one of the privately-managed funds that would be established would be the Arizona BioSeed Fund, which would manage a biosciences portfolio of investments and team with other investments made from the Fund of Funds in related device and bioinformatics opportunities.

Preferences Appropriate to Arizona

It is suggested that the Strategic Investment Board handle disbursements/investments from the Fund of Funds (and perhaps other opportunities that may arise in the future) in ways similar to those in the Maryland Trust legislation. These preferences would not necessarily need to be legal documents but “good faith” side-bar documents of intent by investors and investees to help build Arizona’s technology base.

Locale. Eligible investee funds would be only those which have or agree to open full-time Arizona offices.

Targeting. Eligible funds should be committed by charter to place all their investments in businesses substantially overlapping the fields identified in the core competencies identified in various Battelle reports for the Flinn Foundation and the Arizona Department of Commerce (information technology, communications, biosciences and the niche areas within each).

Stage of investment. No fund committed predominantly to later-stage investment should be eligible.

Best efforts. Eligible funds should agree that amounts equal at least to the fund of fund’s investments in them be placed in Arizona businesses.

Other. Eligible funds should agree to establish relationships with the technology transfer offices of Arizona’s universities, and any early-stage funds created under provisions of the venture-investment tax credit described in the section above.

Potential Sources of Funding

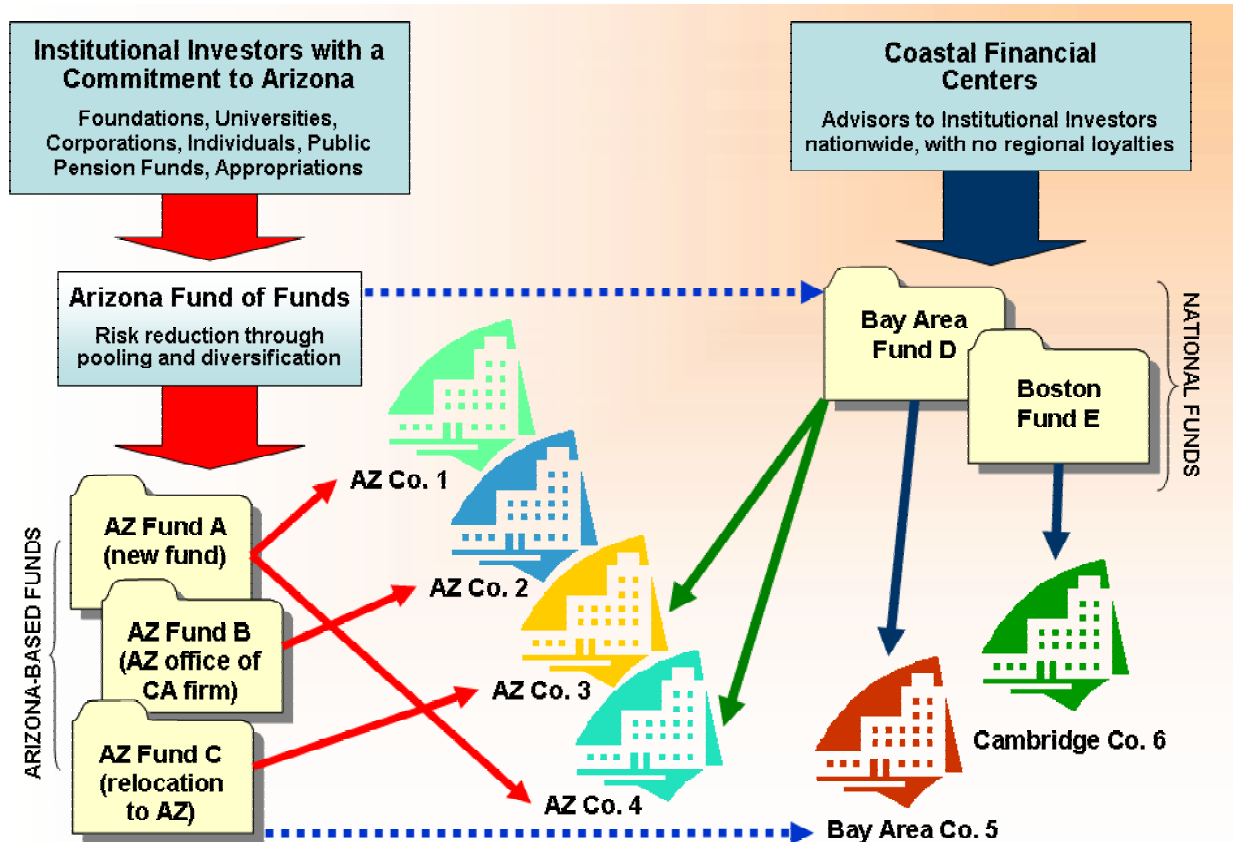
Table 1 on the following page lists potential sources of funding and how to think about calculating reasonable amounts they could contribute.

Potential Leverage

Figure 1-1 shows how a fund of funds can catalyze flow of out-of-state investment dollars into Arizona. This becomes particularly important to Arizona’s biosciences firms whom need access to sources of capital through an extended life cycle in which there are significant regulatory hurdles and the need for considerable cash prior to a product entering the marketplace.

| Table 1 | Ways to Capitalize an Arizona Fund of Funds |
|--------------------------------------|---|
| State appropriation | In Maryland appropriation was about 10 percent of the Trust’s ultimate capitalization. If the fund of funds target were about \$100 million, an appropriated contribution held by some state agency acting as a limited partner could be in the range of \$10 million. Potential sources include the general fund and/or transfers from other funds such as tobacco tax, tobacco settlement, and water revenues. Sources funded by bonding (revenue or GO) are unlikely due to conventional restrictions against using borrowed money to invest in equity instruments |
| Public pension funds | Arizona’s public pension funds total about \$30 billion in assets including the state funds and those of the cities of Phoenix and Tucson. They are all well behind national averages on their venture allocations. If they invested 2 percent in venture capital and a just a tenth of that in the fund of funds, this could raise \$60 million. Presumably like Maryland Arizona would want to cap the total exposure, possibly higher or lower. |
| Private pension funds | There are also billions in ERISA pension funds (corporate sponsored) in Arizona. It is very difficult to say whether they would participate at all in such a vehicle or at what level. |
| University and foundation endowments | A reasonable estimate of the total asset size of all university, hospital and foundation endowments in Arizona might be on the order of \$1 billion. Nationally, this class of investors allocates a high percentage to venture investing, frequently over 10 percent. If the pool of all such investors could reach 10 percent allocation to venture with a quarter of that in the fund of funds, this would raise \$25 million. |
| Private for-profit investors. | Unknown level of interest. Potentially the pool is large but asset allocations very difficult to estimate. |

Figure 1-1: Hypothetical Distribution of Investments: An Arizona Fund of Funds



Summary and Conclusions

The Arizona Capital Formation/Incentives Work Group has identified several objectives that need to be a focus of capital formation for the biosciences. First, the state tax code should be designed to encourage private investors to increase their private investments in Arizona-based bioscience enterprises. Second, ways must be found to encourage the formation of more venture firms, their size, and their willingness to address all stages of the life cycle of bioscience firms, including pre-seed and seed stages. And, third, ways must be found encourage more university-industry partnerships including sponsored research that can lead to new products and/or health care treatment and prevention for the citizens of the Arizona. This Capital Formation/Incentives Work Group has identified three action areas that can help achieve these objectives including modifications to the State’s R & D tax credit to encourage more university-industry partnering; a venture investment tax credit to encourage residents to invest in bioscience and other technology areas; and formation of an Arizona Fund of Funds to invest in several privately managed funds including a BioSeed Fund.

APPENDIX A:

**MEMBERSHIP OF THE CAPITAL
FORMATION/INCENTIVES WORK GROUP**

CAPITAL FORMATION/INCENTIVES WORK GROUP ROSTER

Lawrence J. Aldrich
Fund Manager
Valley Ventures, LLC
6245 E. Broadway Blvd., Suite 620
Tucson, AZ 85711
(W): (520) 327-5556
(F): (520) 327-5665
larry@valleyventures.com

Richard Baron, President
Northern Arizona Technology & Business
Incubator (NATBI)
1300 South Milton Road, Suite 123
Flagstaff, AZ 86001
(W): (928) 213-9234
(F): (928) 556-0940
rbaron@natbi.org

Kendall Bert, Director
Department of Economic Development
City of Tucson
P.O. Box 27210
Tucson, AZ 85726-7210
(W): (520) 791-5093
(F): (520) 791-5413
kbert1@mail.ci.tucson.az.us

Warren A. Carsey
Veritas Holdings, Inc.
5005 Lake Country Road
Flagstaff, AZ 86004
(W): (928) 714-1888
(F): (928) 955-2339
warren.carsey@veritasholdings.com

Lisa Danka, Executive Director
Commerce & Economic Development
Commission
Arizona Department of Commerce
1700 W. Washington Street
Phoenix, AZ 85007
(W): (602) 771- 1165
(F): (602) 771- 1200
lisad@azcommerce.com

Harry George
Solstice Capital
6245 East Broadway, Suite 620
Tucson, AZ 85711
(W): (520) 514-8000
(F):
hgeorge@solcap.com

Jock Holliman
General Partner
Valley Ventures II, L.P.
6720 North Scottsdale Road, Suite 280
Scottsdale, AZ 85253
(W): (480) 661-6600
(F): (480) 661-6262
jock@valleyventures.com

Gail Lewis Howard
Economic Development Advisor
Office of the Governor
Capitol Complex
1700 West Washington Street
Phoenix, AZ 85007
(W): (602) 542-1336
(F):
ghoward@az.gov

Paul T. Katsenes, Deputy Director
Community & Economic Development
City of Phoenix
200 W. Washington St., 20th Floor
Phoenix, AZ 85003-1611
(W): (602) 534-2445
(F): (602) 495-5097
pkatsene@ci.phoenix.az.us

Shaun A. Kirkpatrick
Vice President & Managing Director
Research Corporation Technologies
1101 North Wilmot Road, Suite 600
Tucson, AZ 85711-3365
(W): (520) 748-4446
(F): (520) 748-0025
rct2sak@aol.com

CAPITAL FORMATION/INCENTIVES WORK GROUP ROSTER

Noah Kroloff

Chief Assistant for Policy
Office of the Governor
Capitol Complex
1700 West Washington
Phoenix, AZ 85007
(W): (602) 512-1395
(F): (602) 542-7601
nkroloff@az.gov

Charlie Lewis

Arris Ventures, LLC
9495 E. San Salvador Dr., Suite 150
Scottsdale, AZ 85258
(W): (480) 505-0494
(F):
clewis@arrisventures.com

Richard Mallery, Esq.

Partner
Snell & Wilmer, LLP
One Arizona Center
Phoenix, AZ 85004-2202
(W): (602) 382-6232
(F): (602) 382-6070
rmallery@swlaw.com

Harry Papp

L. Roy Papp & Associates
6225 N. 24th Street, Suite 150
Phoenix, AZ 85016
(W): (602) 956-0980
(F):
harryp@roypapp.com

Robert Pothier

Partner
Wasatch Venture Capital
51 West 3rd Street, Suite 201
Tempe, AZ 85281
(W): (480) 377-6740
(F): (480) 377-6701
rpothier@wasatchvc.com

Julia Rosen

Director of Economic Affairs
Arizona State University
P. O. Box 872703
Tempe, AZ 85287- 2703
(W): (480) 727-7030
(F):
julia.rosen@asu.edu

James M. Strickland, Co-Chair

General Partner
Coronado Venture Management
P.O. Box 65420
Tucson, AZ 85728
(W): (520) 577-3764
(F):
jim@coronadoventurefund.com

Stephen Todd

Executive Vice President
Bank Performance, Western Region
Capitol Bancorp
2777 E. Camelback Road, Suite 375
Phoenix, AZ 85016
(W): (602) 522-3752
(F): (602) 955-6978
stodd@capitolbancorp.com

Dan Twibell

Executive Vice President
ConsultCHS
7580 E. Gray Road, Suite 101
Scottsdale, AZ 85260
(W): (480) 609-4367
(F): (480) 905-8394
dtwibell@consultCHS.com

Terree Wasley, Vice President

Entrepreneurial Services &
Business/Education Programs
Greater Phoenix Chamber of Commerce
201 N. Central Avenue, 27th Floor
Phoenix, AZ 85073
(W): (602) 495-6470
(F): (602) 495-8913
twasley@phoenixchamber.com

CAPITAL FORMATION/INCENTIVES WORK GROUP ROSTER

Sandra Watson. Executive Director
Governor's Council on Innovation &
Technology, Executive Office
Arizona Department of Commerce
1700 W. Washington Street
Phoenix, AZ 85007
(W): (602) 771-1215
(F): (602) 771-1209
sandraw@azcommerce.com

Quinn P. Williams, Co-Chair
Attorney at Law
Greenberg Traurig, LLP
2375 E. Camelback Road, Suite 7
Phoenix, AZ 85016
(W): (602) 445-8344
(F): (602) 445-8100
WilliamsQ@GTLaw.com

Edmund Zito
Chief Executive Officer
Comerica
400 E. Van Buren, Suite 900
Phoenix, AZ 85004
(W): (602) 417-1104
(F):
edmund_zito@comerica.com

Technology Partnership Practice Battelle Memorial Institute

Walter H. Plosila, Ph.D.
Vice President
Technology Partnership Practice
Battelle Memorial Institute
20445 Emerald Parkway Drive, SW
Suite 200
Cleveland, OH 44135
(W): (216) 898-6403
(F): (216) 898-6570
plosila@battelle.org

The Flinn Foundation

Don Snider
Associate Director of Finance
The Flinn Foundation
1802 N. Central Avenue
Phoenix, AZ 85004
(W): (602) 744-6821
(F): (602) 744-6825
dsnider@flinn.org

Sandra Johnson
Associate Director of Public Programs
The Flinn Foundation
1802 N. Central Avenue
Phoenix, AZ 85004
(W): (602) 744-6804
(F): (602) 744-6815
sjohnson@flinn.org