

EXECUTIVE SUMMARY

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**INFORMATION ITEM:** REVIEW OF FY 2004 UNIVERSITY TECHNOLOGY TRANSFER REPORTS

**ISSUE:** As required by Board Policy 6-909.10 Technology Transfer Policy, the Board will review the universities' technology transfer reports highlighting activities and performance for the fiscal year ending June 30, 2004.

**BACKGROUND:**

- ▶ The universities' reports indicate an increase in numbers of patents issued (38 compared to 30 in FY 2003) and licenses/options signed (46 compared to 37), but indicate a slight decrease in systemwide invention disclosures (191 compared to 201 in FY 2003) and patent applications (191 compared to 210). The universities also reported a slight increase in licensing revenue, generating \$2.4 million compared to \$2.2 million in FY 2003, a 12% increase.
- ▶ The universities report the following technology transfer activity during FY 2004:

**FY 2004**

|                         | <b>ASU</b>  | <b>NAU</b> | <b>UA</b>   | <b>Total</b> |
|-------------------------|-------------|------------|-------------|--------------|
| Invention Disclosures   | 94          | 2          | 95          | 191          |
| US Patent Applications  | 99          | 1          | 91          | 191          |
| Patents Issued          | 19          | 1          | 18          | 38           |
| Licenses/Options Signed | 20          | 1          | 25          | 46           |
| Licensing Revenue       | \$1,421,835 | \$0        | \$1,008,621 | \$2,430,456  |

- ▶ ASU's report appears on pages 2-9 of this Executive Summary; NAU's on pages 10-12; and UA's on pages 13-19. Each university's report highlights other specific achievements.

**RECOMMENDATION:**

The universities' FY 2004 technology transfer reports are presented to the Board as an information item.

|                               |              |                       |
|-------------------------------|--------------|-----------------------|
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**INFORMATION ITEM:** FY 2004 Report on Technology Transfer at Arizona State University.

**ISSUE:**

This University Technology Transfer Report is submitted in compliance with Article G of the ABOR Policy No. 6-909.10 "Technology Transfer Policy." The purpose of this report is to highlight the activities and performance of ASU and Arizona Technology Enterprises (AzTE), the technology commercialization and intellectual property management company for ASU, in the area of technology transfer through the fiscal year ending June 30, 2004.

**BACKGROUND AND INTRODUCTION:**

This report provides an overview of historical data as well as provides the highlights of ASU's patenting and licensing activities for FY 2004.

ASU continues to build its technology venturing and commercialization capabilities through investment of Proposition 301 Funds. Through AzTE, ASU has expanded the scope of technology transfer to include a new emphasis on technology venturing, start-up company formation, and industrial partnership building. In FY 2004, some of AzTE's primary objectives included (1) building a world-class team and infrastructure to engage in technology ventures, (2) developing strong relationships with faculty to promote innovation and identify and evaluate ASU technologies, (3) building relationships with the business community, and (4) engaging in value-generating transactions. AzTE made significant progress in all of these areas.

AzTE was formally established on November 1, 2003. Activity of the AzTE team began in July, 2003 under the umbrella of the ASU Foundation. Therefore, the financial and other information contained herein reflects AzTE's first full year of operations beginning July 1, 2003.

**DISCUSSION:**

**I. TECHNOLOGY TRANSFER STATISTICS FOR FY 2004 AND PRIOR YEARS**

**Table 1** provides a current and historic overview of AzTE's technology transfer activities. In summary, AzTE reports 94 new invention disclosures, 99 new U.S. patent applications filed, and 19 patents issued. In addition, 20 licenses or options to ASU technology were executed in FY 2004. AzTE manages the maintenance and prosecution of Northern Arizona University's (NAU) patent portfolio. These activities are reported by NAU separately.

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Table 1, Technology Transfer Statistics for FY 2000 through FY2004:

|                                  | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004         |
|----------------------------------|---------|---------|---------|---------|-----------------|
| # Invention Disclosures from ASU | 64      | 63      | 97      | 86      | 94              |
| # US Patent Applications         | 52      | 69      | 108     | 132     | 99 <sup>1</sup> |
| # Patents Issued (US only)       | 11      | 15      | 11      | 17      | 19              |
| # Licenses / Options Signed      | 10      | 11      | 9       | 9       | 20              |

<sup>1</sup> Reflects a higher level of scrutiny employed in making patent filing decisions.

**II. REVENUE & DISTRIBUTIONS FOR FY 2004 AND PRIOR YEARS**

AzTE budgeted \$3,442,225 for operating expenses for FY 2004. In FY 2004, AzTE spent \$3,342,798 on operating expenses. While patent expenses were greater than anticipated, this positive budget variance overall can be attributed to lower than expected start-up costs for consultants, third-party providers, and other items.

**Table 2** summarizes financial data for ASU's technology transfer program for FY 2000 through FY 2004. This financial summary has been reformatted from the summaries provided in prior ABOR Technology Transfer Reports to provide a more accurate summary of ASU's technology transfer operations. For comparison purposes, the financial summary from the FY 2003 Technology Transfer Report is attached as **Exhibit 1**.

Table 2, Technology Transfer Financial Data for FY 2000 through FY 2004:

| Revenue   | FY 2000          | FY 2001          | FY 2002          | FY 2003          | FY 2004          |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Total Licensing and Other Revenue</b>          | <b>1,455,494</b> | <b>1,746,531</b> | <b>1,770,340</b> | <b>1,092,784</b> | <b>1,421,835</b> |
| <b>Components of Total Revenue:</b>               |                  |                  |                  |                  |                  |
| Licensing Revenue                                 | 1,455,494        | 1,746,531        | 1,770,340        | 1,092,784        | 1,397,085        |
| Options and Other Revenue                         | N/A              | N/A              | N/A              | N/A              | 24,750           |
| <b>Total Sponsored Research Generated by AzTE</b> | <b>281,925</b>   | <b>1,518,869</b> | <b>1,163,001</b> | <b>1,166,298</b> | <b>430,509</b>   |

| <b>Royalty Distribution Summary:</b> |           |           |           |           |           |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Royalties Distributed to Inventors   | (306,519) | (513,597) | (392,443) | (345,357) | (308,513) |
| Royalties Distributed to Labs        | (480,169) | (589,139) | (375,939) | (340,384) | (299,670) |
| Royalties Retained by University     | (298,776) | (444,910) | (312,932) | (307,405) | (290,718) |

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**III. Summary of FY 2004 Patent Activity**

**Table 3** provides a breakdown of patent filing and issuance activity across ASU's academic departments for FY 2004 to identify where technology patenting activity is concentrated.

Table 3, Patent Activity by Department for FY 2004

| Department                      | Disclosures Received | Provisional Filed | Patents Issued | US Patents Only |
|---------------------------------|----------------------|-------------------|----------------|-----------------|
| Bio-Engineering                 | 19                   | 16                | 2              | 2               |
| School of Life Science          | 6                    | 5                 | 1              | 1               |
| Cancer Research Institute       | 3                    | 5                 | 20             | 2               |
| Chemistry/Biochemistry          | 14                   | 12                | 1              | 0               |
| Communications/<br>Business     | 4                    | 4                 | 0              | 0               |
| Fulton School of<br>Engineering | 35                   | 39                | 22             | 10              |
| School of Construction          | 1                    | 1                 | 0              | 0               |
| Applied Bioscience              | 2                    | 2                 | 0              | 0               |
| Physics/Astronomy               | 6                    | 6                 | 5              | 3               |
| ASU East Engineering            | 4                    | 4                 | 1              | 1               |
| <b>Totals:</b>                  | <b>94</b>            | <b>94</b>         | <b>52</b>      | <b>19</b>       |

**IV. Summary of FY 2004 Highlighted Activities**

The following summary provides more information on activities summarized above as well as highlights certain of AzTE's other activities and accomplishments during FY 2004:

**A. Start-Up Company Activity**

- L'Eau Corp.:** L'Eau was formed by Dr. James Beckman, Professor and Associate Chair of Chemical and Materials Engineering, to develop a unique, low-cost water purification technology capable of converting undrinkable water into drinkable water. The underlying patented technology has commercial potential in numerous large international markets including municipal/governmental water departments, industries with significant environmental and/or water issues, the military and consumer markets. In addition, this technology could have major humanitarian impact, especially in the developing countries. The technology also has other applications where separation of liquids would be advantageous. L'Eau has received grants to fund the further development of this technology and is currently selling product.

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- **AzERx, Inc.:** AzERx was formed by Drs. Collen Brophy, Alyssa Panitch and Lokesh Joshi of the Biodesign Institute's Center for Peptide and Protein Pharmaceuticals. AzERx is developing proteomic drugs using unique technology discovered by the founders covering the peptide family responsible for smooth muscle relaxation, a much sought-after pharmaceutical target. This proteomic basis hopes to yield drugs with highly specific activity without the side effects of current products, which will enable new indications to be served as well as improve current targets. The company is currently seeking \$8M start-up funding to finance work needed to complete phase 2 trials for its first two indications, subarachnoid hemorrhage (SAH) and asthma. The company has received an option to ASU intellectual property in this area from AzTE.
- **Nanobiomics, Inc.:** Nanobiomics was jointly formed by AzTE and The Translational Genomics Research Institute (TGen) to develop molecular diagnostic products that combine the microfluidics and sample preparation platforms developed by the Biodesign Institute's Center for Applied Nanobioscience, with TGen's molecular signatures. Frederic Zenhausern of the Biodesign Institute is one of the founders of the company. The company is currently in the process of raising private investment funds. Nanobiomics has received an option from both AzTE and TGen to acquire the intellectual property it will require to develop its products.
- **Neural Intervention Technologies, Inc. (NIT):** NIT is a biotechnology company developing biomaterials to treat vascular occlusions. The technology underlying NIT's products was originally developed by Daryl Kipke, formerly a professor at ASU, who has since moved to the University of Michigan. AzTE and the University of Michigan have jointly licensed their respective intellectual property to NIT as a "bundle" in order to increase its value. The Company has obtained approximately \$2.2 million from the Michigan Life Science Corridor to continue development of the technology. NIT is currently in pre-clinical development.

### **B. Deal Highlights**

In addition to the licenses and options that have been granted to the ASU start-up companies described above, AzTE consummated licensing and other transactions during FY 2004. Some of these include:

- **In-Q-Tel:** One of the three initial university relationships with the venture capital firm of the U.S. Central Intelligence Agency. The focus of the transaction is to perform development and feasibility assessment of ASU intellectual property emerging from PRISM (Partnership for Research in Spatial Modeling) labs. The deal includes sponsored research and an option to license the technology.
- **Pacific Brands:** AzTE licensed Allene Oxide Synthase technology for development in food and agriculture and cellular technology applications. The deal included upfront fees, annual payments, milestones, and royalties on future net sales.
- **Seattle Genetics:** AzTE entered into a license with Seattle Genetics to extend and increase annual payments through 2014 for the Auristatin E, an anti-cancer compound developed by ASU's Cancer Research Institute.
- **Rose Street Labs:** AzTE granted Rose Street Labs an option to license certain biosensor technology developed by professors at ASU's Harrington School of Bioengineering for use in multiple market applications including obesity. The deal includes sponsored research to prove principle on the technology along with an option to license the technology.

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- **Performance-Based Procurement System:** AzTE started an industry licensing program to license a unique software platform to a number of companies on a non-exclusive basis. Deals also include funding to assist in the implementation of the software.

### C. Strategic Relationship Building

AzTE focuses on developing strategic, world-wide partnerships to assist in its technology commercialization efforts. These strong connections to other research institutes and business partners will accelerate the pace of commercialization as well as enhance the value of the technology developed. Some of the relationships AzTE has established in FY 2004 include:

- **Mayo Clinic and Mayo Medical Ventures:** Joint technology development and commercialization.
- **The Translational Genomics Research Institute:** Joint technology development and commercialization.
- **Northern Arizona University:** Assist NAU with technology transfer and new company formation initiatives.
- **Technologico de Monterrey (Mexico):** Developing a joint start-up company and identifying joint technology commercialization opportunities.
- **Pankhurst Development & Design, Ltd. (UK):** Provide development, prototyping and joint commercialization opportunities for ASU technology in exchange for share of commercialization revenues.
- **Tsinghua Holdings/Tsinghua Venture Capital (Beijing, China):** Joint evaluation, commercialization and new venture creation being developed.
- **Applied Biosystems Incorporated:** Jointly evaluating opportunities in bio-analytical technology and other collaborations.
- **Bard:** Identifying technologies of interest for development and commercialization in the areas of medical devices and vascular technologies.
- **Prolexsys:** Consummated a development partnership to identify compounds using an ASU proprietary protein model.

### D. Issued Patents

The following are some examples of patents that have been issued to ASU during FY 2004:

- **Patent No. 6,952,566**

**Issued: 7/15/2003**

**Title: "Method for Forming an Endovascular Occlusion"**

**Inventors:** Daryl Kipke, Tim Becker & Vance Collins

Endovascular polymer treatment is a relatively new and expanding field. Clinical uses of endovascular polymers include, but are not limited to, treatments for arteriovenous malformations (AVMs), aneurysms, excessive blood supplies to tumors, and control of massive vascular hemorrhaging. Researchers at ASU have found that the polymer gel, alginate, can be used as an in vivo endovascular occlusion material by optimizing its material properties for ease of delivery, biocompatibility, and mechanical stability. Bioengineering analyses have shown that the material can be selectively delivered to vessels from microcatheters so as to form a stable biocompatible gel able to withstand in vivo blood pressures without dislodging or degrading. Because the material is non-adhesive, it does not exhibit the biocompatibility problems associated with polymer glues.

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- **Patent No. 6,737,286**  
**Issued: 5/18/2004**  
**Title: “Apparatus and Method for Fabricating Arrays of Atomic-Scale Contacts and Gaps Between Electrodes and Applications Thereof”**  
**Inventors: Nonjian Tao & Salah Boussaad**

Commercial applications of nanotechnology require reliable and cost-effective methods to manufacture nanostructured materials and devices. Atomic-scale contacts between metal electrodes have been created by breaking fine metal wire and by separating two metal electrodes in contact. Researchers at ASU have invented a self-terminated method to fabricate atomic-scale contacts and molecular-scale gaps between metal electrodes. This method can quickly and reliably mass-produce large arrays of atomic-scale contacts and gaps for various applications, including chemical and biological sensors, magnetoresistive sensors and molecular electronic and optoelectronic devices.

**E. Other Activities**

The following is an overview of some other AzTE activities for FY 2004:

- **Technology Venture Clinic:** In order to increase deal-making activity while delivering significant value to the university, AzTE established the Technology Venture Clinic (TVC), a student clinic run by AzTE and financially sponsored by Rogers & Theobald and The Wasatch Venture Fund. The TVC offers top graduate students from ASU’s law, business, engineering and liberal arts colleges the opportunity to receive credit for working on technology assessment, business plans, licensing and other transactions at AzTE. After only one semester of operations, the TVC has been touted as a unique and effective program and is being used as a recruiting tool by many of the participating colleges.
- **www.azte.com:** In order to promote AzTE more effectively in the business community and to provide information and services to ASU faculty, AzTE has developed a new website containing information on deal making processes, technologies and programs at ASU, guidance on policies that govern new-company formation and a wealth of other information. The website is very user friendly and provides important information for companies who wish to do business with AzTE and ASU. AzTE is in the process of linking the website to the homepages of a number of our important business partners including the Arizona Technology Council and the Flinn Foundation. Summaries of many ASU technologies available for commercialization are available for review at [www.azte.com](http://www.azte.com).
- **AzTE Venturing Magazine and AzTE Lecture Series:** Building strong relationships with faculty is one of AzTE’s most important missions. As such, AzTE continually looks for creative ways to provide value-added resources to ASU researchers. One example of this is the newly created *AzTE Venturing Magazine*. *AzTE Venturing* is a bi-monthly periodical published by AzTE with valuable articles and other information about AzTE deals, projects and innovative ASU researchers. The AzTE Lecture Series is a bi-monthly lecture series where speakers are invited to meet with faculty members and other ASU employees to discuss topics relating to technology transfer, venture capital, innovation and other related topics.

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- **The ASU Innovation Fund:** AzTE works with faculty inventors and the business community to commercialize new discoveries and innovations developed through ASU. Many of these innovations need technical advancement in order to make them attractive to potential licensees or investors. With this in mind, AzTE has partnered with The Arizona State University Research Park, Inc. (ASURP) and ASU to form “The ASU Innovation Fund” dedicated to providing proof-of-concept and prototype development funding to faculty in order to develop ASU technology for commercialization. The Fund makes investment decisions based on the commercial potential of the technology as well as the impact that funding will have on getting the technology to market.
- **Operational Achievements:** AzTE achieved many operational milestones during FY 2004. These included: (1) developing deal tracking, financial tracking and forecasting systems for deal evaluation and analysis, (2) incorporating a new “knowledge management system” to cluster patents and other intellectual property together based on market needs, and (3) establishing “best practice” operating systems and policies to govern operations. AzTE also developed an effective process to evaluate transaction opportunities and evaluate intellectual property for consideration for patent filings. All of these new programs and system will be instrumental in contributing toward the company’s future success.

## RECOMMENDATION/CONCLUSION

This Annual Report on technology transfer is provided as information to the Board.

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**Exhibit 1**

**Financial Summary Report from FY 2003 ABOR Technology Transfer Report**

|   | <b>FY1998</b>      | <b>FY 1999</b>    | <b>FY 2000</b>     | <b>FY 2001</b>  | <b>FY 2002</b>     | <b>FY2003</b>        |
|---|--------------------|-------------------|--------------------|-----------------|--------------------|----------------------|
| Gross Licensing Revenue   | \$474,260          | \$1,019,864       | \$1,455,494        | \$1,746,531     | \$1,770,340        | \$1,092,784          |
| Less Actual Legal Fees Expended   | (\$503,472)        | (\$363,456)       | (\$488,353)        | (\$597,318)     | (\$1,273,287)      | (\$1,113,868)        |
| Less Royalty Distributions to Inventors   | (\$128,035)        | (\$260,553)       | (\$306,519)        | (\$513,597)     | (\$392,443)        | (\$345,357)          |
| Less Technology Transfer Research fund contribution ("lab shares")  | (\$128,035)        | (\$260,553)       | (\$480,169)        | (\$589,139)     | (\$375,939)        | (\$340,384)          |
| Plus indirect cost recovery from Technology transfer research contracts   | \$78,332           | \$100,200         | \$76,524           | \$421,763       | \$399,897          | \$300,443            |
| Less Technology Transfer Operating Expenses   | (\$269,272)        | (\$295,342)       | (\$438,683)        | (\$447,613)     | (\$396,258)        | (\$1,008,302)        |
| <b>Remainder for operations:</b>  | <b>(\$476,222)</b> | <b>(\$59,840)</b> | <b>(\$181,706)</b> | <b>\$20,627</b> | <b>(\$267,690)</b> | <b>(\$1,414,684)</b> |
| Additional Direct Cost Revenue from Industrial Research Agreements created by Office of Technology Collaborations and Licensing | \$198,747          | \$123,688         | \$205,401          | \$1,097,106     | \$763,104          | \$865,855            |

**EXECUTIVE SUMMARY**

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**INFORMATION ITEM:** FY 2004 Report on Technology Transfer at Northern Arizona University

**ISSUE:** This University Technology Transfer Report is submitted in compliance with Article G of ABOR Policy No. 6-909-10 "Technology Transfer Policy."

**BACKGROUND AND INTRODUCTION:**

This report provides an overview and highlights the activities and performance of Northern Arizona University in the area of technology transfer during the fiscal year ending June 30, 2004.

NAU's technology transfer program has continued to develop over the past fiscal year with one new patent and four new copyrights. A major goal of NAU's technology transfer program this past year has been to begin negotiation with Arizona Technology Enterprises (AzTE) to manage NAU's technology portfolio. Progress has been made with the completion of a draft agreement similar to the agreement between AzTE and Arizona State University. It is anticipated that once the agreement is approved, NAU will be in a position to take full advantage of AzTE services and expertise.

NAU has also established an agreement with the Northern Arizona Technology and Business Incubator (NATBI). NATBI is providing assistance to NAU in the commercialization and development of NAU-based technology and in improving NAU's collaborative research with business and industry. NATBI will be a tenant in the new Applied Research & Development building scheduled for completion in 2006

**DISCUSSION:**

**I. TECHNOLOGY TRANSFER STATISTICS FOR FY 2004 AND PRIOR YEARS**

The following historical and current data summarizes the state of the technology transfer program at NAU. For FY 2004, we report two invention disclosures, one patent filing, one issued patent, four copyrights, and one agreement.

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Table 1, Technology Transfer Statistics for FY 2000 through FY2004:

|                         | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 |
|-------------------------|---------|---------|---------|---------|---------|
| Invention Disclosures   | 3       | 3       | 7       | 2       | 2       |
| US Patent Applications  | 2       | 2       | 4       | 6       | 1       |
| Copyright Registrations | 1       | 0       | 1       | 1       | 4       |
| Patents Issued          | 0       | 0       | 1       | 1       | 1       |
| Licenses / Options      | 0       | 0       | 1       | 1       | 1       |

**II. REVENUE & DISTRIBUTIONS FOR FY 2004 AND PRIOR YEARS**

The following chart summarizes the financial picture for Northern Arizona University's technology transfer program for Fiscal Years 2000 through 2004. FY 2004 has been a very strong research year with support for technology transfer through contracts and grants funded by the National Institutes of Health, Department of Energy, Department of Defense, and Department of Justice. It is anticipated in the coming years this research will lead to an increase in technology transfer activities.

Table 2, Technology Transfer Financial Data for FY 2004:

|  | FY 2000   | FY 2001    | FY 2002    | FY 2003    | FY 2004    |
|--|-----------|------------|------------|------------|------------|
| Gross licensing revenue:   | \$ -      | \$ -       | \$ -       | \$ -       | \$ -       |
| Less actual legal fees expended:   | \$ 2,550  | \$ 18,019  | \$ 9,839   | \$ 49,706  | \$ 119,809 |
| Less royalty distributions to inventors:                                 | \$ -      | \$ -       | \$ -       | \$ -       | \$ -       |
| Less technology transfer research fund contribution ("lab shares"):      | N/A       | N/A        | N/A        | N/A        | N/A        |
| Plus indirect cost recovery from technology-transfer research contracts: | \$ 95,807 | \$ 103,534 | \$ 167,236 | \$ 225,797 | \$ 249,595 |
| Less technology transfer operating expenses:                             | \$ -      | \$ -       | \$ -       | \$ -       | \$ -       |
| Remainder for operations:  | \$ 93,257 | \$ 85,515  | \$ 157,397 | \$ 176,091 | \$ 129,786 |
| Additional revenue from technology transfer contracts:                   | \$ -      | \$ -       | \$ 77,000  | \$ 729,000 | \$ -       |

**III. SUMMARY OF HIGHLIGHTED 2004 ACTIVITIES**

The following chart shows a breakdown in patent filing and issuance activity across NAU's academic departments for 2004 where technology transfer activity has occurred.

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| Department                              | Disclosures | Patent Applications | Patents Issued | Copyright Registrations |
|---|-------------|---------------------|----------------|-------------------------|
| Chemistry                               | 1           | 1                   | 0              | 0                       |
| Bilby Research Center                   | 0           | 0                   | 0              | 4                       |
| Laboratory for Advanced Instrumentation | 1           | 0                   | 0              | 0                       |
| Physics & Astronomy                     | 0           | 0                   | 1              | 0                       |

**A. Agreements**

*Bay Materials, LLC* - Bay Materials is developing sensor technology in cooperation with and based on NAU research led by Dr. Tim Porter, Professor and Chair, NAU Department of Physics and Astronomy. Bay Materials holds a license option agreement with NAU to develop a commercial hydration sensor with specific applications in the military, medical, and extreme sports markets. Current support for the commercial development of the hydration sensor is being provided by Bay Materials, Department of the Army (SBIR), and the Department of Energy.

**B. Issued Patents**

*Hybrid Microcantilever* – Drs. Timothy Porter and Michael Eastman (NAU Departments of Physics and Chemistry, respectively) have developed a sensor technology that was issued a patent in FY 2004. The technology is currently being developed under a license option agreement with Bay Materials, LLC. The technology is based on a sensing polymer that effectively characterizes the hydration state of humans. It is anticipated that the final commercial product will function in a way similar to the common thermometer.

**C. MOU WITH AZTE TO SUPPORT TECHNOLOGY TRANSFER AT NAU**

NAU began its technology transfer program through a Memorandum of Understanding (MOU) between ASU and NAU beginning October, 1999. With the increase in technology transfer activity at NAU and the establishment of AzTE, NAU has begun negotiations with AzTE to support its technology transfer activities. At this time, NAU does not have the intellectual property demand nor the financial resources required to support the necessary technology transfer professional and legal support staff. Arizona Technology Enterprises (AzTE) has provided to NAU technology transfer services in a manner similar to the previous MOU with ASU, i.e., on a cost reimbursement basis. NAU and AzTE are currently in the process of negotiating a new MOU and a draft agreement has been developed over the last year. The new agreement will be increasingly beneficial to faculty, staff, and students of NAU because it brings the experience, expertise, and depth of resources of AzTE to the support of NAU patent and license applications. The state of Arizona will continue to benefit from this MOU through a reduction in overall costs as well as the prevention of program duplication.

**RECOMMENDATION/CONCLUSION**

This report is provided as information to the Board.

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**INFORMATION ITEM:** FY 2004 Report on Technology Transfer at The University of Arizona

### ISSUE

This University Technology Transfer Report is submitted in compliance with Article G of ABOR Policy No. 6-909.10 "Technology Transfer Policy" by the Office of Technology Transfer (OTT) of the University of Arizona (UA). The purpose of this report is to provide an overview of historical data as well as highlight the activities and performance in the area of technology transfer during the fiscal year ending June 30, 2004.

### BACKGROUND AND INTRODUCTION

The OTT continues to demonstrate the effectiveness of the investment in technology transfer activities undertaken by ABOR and UA. The focus of efforts in fiscal year 2004 was to expand the capabilities of the OTT, build strong partnerships with internal and external organizations that would leverage our resources, accelerate outreach activities to the faculty and community, and increase the number of license-based relationships contributing to the success of UA and Arizona. Results that highlight our activities are:

- Five new startup companies were formed in fiscal year 2004 from technologies managed by OTT, four of which are based in Arizona.
- The OTT worked in partnership with the McGuire Program in Entrepreneurship on six new student projects based on OTT-managed innovations that led to startup business plans. One of the student teams, Leading Lazonics, was selected to participate as one of eight finalists in the prestigious 2004 Spirit of Entrepreneurship and Enterprise Development national business plan competition sponsored by TechKnowledge Point.
- Fiscal Year 2004 news of note associated with UA licenses and technology:
  - Jeneil Biosurfactant Co., a Wisconsin company, was the 2004 recipient of the Presidential Green Chemistry Challenge Award administered through the U.S. Environmental Protection Agency. The national award recognizes Jeneil's efforts commercializing UA technology for the environmentally responsible control of plant pathogens.
  - Developmental Therapeutics, a fiscal year 2003 UA startup based upon a drug technology from UA and VA researchers, was acquired by Titan Pharmaceuticals. This acquisition will accelerate the time to market of this new therapeutic for congestive heart failure.
  - Reprotect introduced a new diagnostic test for bull fertility to the veterinary market at the National Cattle Beef Association meeting in Phoenix. Based upon patented UA technology, the test represents a major advance in art and accuracy of such tests, giving cattle operations a major new tool for improving profitability.

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**DISCUSSION**

**I. Technology Transfer Statistics for Fiscal Year 2004 and Prior Years**

Table 1 summarizes technology transfer statistics for the five fiscal years ending in 2004.

**TABLE 1. Technology Transfer Statistics By Fiscal Year**

|  | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>2004</b> |
|--|-------------|-------------|-------------|-------------|-------------|
| Invention Disclosures  | 89          | 111         | 111         | 111         | 95          |
| U.S. Patent Applications<br>(Including Provisional Applications) | 40          | 62          | 56          | 74          | 91          |
| U.S. Patents Issued  | 12          | 9           | 8           | 12          | 18          |
| Major Agreements (Licenses and<br>Options) Signed                | 37          | 26(21)      | 25(18)      | 27(24)      | 39(25)      |

In fiscal year 2004, the OTT staff executed 39 major transactions and licensed 5 startups; major transactions involve considerable effort or complexity to execute and startups conform to the Association of University Technology Managers (AUTM) definition where the technology is licensed and is foundational. Of the 14 agreements not counted in the AUTM number, the majority support research efforts, alliances or inter-institutional interactions. AUTM survey numbers (Licenses & Options Signed) do not count transactions in support of the research enterprise such as Research & Assignment agreements with corporations or Inter-institutional agreements consolidating patent rights among universities for licensing. These agreements position the OTT for future success and meet the needs of the faculty and the university with respect to their broader activities and collaborations with industry. The increase in agreements represents a 44% increase in the number of transactions completed over 2003 with the addition of the equivalent of only 0.5 licensing FTE.

A focus on improving the quality of disclosures to the office resulted in a statistically similar number of disclosures in fiscal year 2004 as in previous years. Over the past two fiscal years, the improvement in disclosure quality and a concentration on working early with the faculty in the innovation process have resulted in a greater number of patent filings and transactions being based upon disclosures made. Improvements in the number of patents issued and major transactions completed reflect this increased activity as well as the increased resources made available to OTT by ABOR and the University.

In support of future licensing, the OTT negotiated over 46 Confidential Disclosure agreements, 47 outbound Biological Material Transfer agreements and 6 Letters of Understanding. These contracts enable UA to disclose proprietary technology or to make UA proprietary materials available to companies and organizations in support of their adoption of UA technologies.

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The OTT continues to facilitate sponsored research through multiple activities including aiding the UA Office of Research and Contract Analysis (ORCA) in complex or difficult intellectual property negotiations. The OTT concluded major negotiations of financial and diligence terms associated with sponsored research agreements in excess of \$2,200,000 and set the IP management framework for a new \$5,000,000 DARPA program in advanced digital camera technologies. In addition to invention reporting to the federal government, the OTT is responsible for verifying the invention reporting associated with the termination of all federally supported grants. In fiscal year 2004, the OTT processed 237 such federal closeout notifications.

**II. Revenue and Distributions for Fiscal Year 2004 and Prior Years**

Table 2 presents the five-year financial summary for technology transfer. Fiscal year 2004 royalty generation remained above \$1 million, with the five-year compound annual growth rate in revenues of 24% per year.

**TABLE 2. Technology Transfer Financial Data By Fiscal Year**

|   | 2000        | 2001        | 2002        | 2003        | 2004        |
|---|-------------|-------------|-------------|-------------|-------------|
| <b>A. Total Royalty Revenue</b>                     | \$368,970   | \$833,954   | \$714,415   | \$1,076,870 | \$1,008,621 |
| Running Royalties & Annuities                       | \$284,454   | \$392,882   | \$354,553   | \$578,466   | \$483,835   |
| One-time fees                                       | \$84,517    | \$441,072   | \$359,862   | \$498,404   | \$524,786   |
|   |             |             |             |             |             |
| <b>B. Sponsored Research</b>                        |             |             |             |             |             |
| Direct Activities                                   | N/A         | N/A         | N/A         | \$615,527   | \$847,175   |
| In Support of ORCA                                  | N/A         | N/A         | N/A         | N/A         | \$2,200,000 |
| Total Approx Contribution To Indirect Cost Pool     | N/A         | N/A         | N/A         | \$121,000   | \$885,000   |
|   |             |             |             |             |             |
| <b>C. Expenses, Cost Recovery And Distributions</b> |             |             |             |             |             |
| Personnel & Operations                              | N/A         | N/A         | N/A         | (\$641,981) | (\$716,775) |
| Legal Expenses                                      | (\$250,000) | (\$230,999) | (\$289,780) | (\$365,990) | (\$488,535) |
| Legal Cost Recoveries                               | \$46,000    | \$45,890    | \$68,968    | \$277,401   | \$332,075   |
| <b>Royalty Distribution Summary</b>                 |             |             |             |             |             |
| To Inventors  | (\$169,973) | (\$288,211) | (\$248,617) | (\$340,416) | (\$296,265) |
| To Laboratories & Units                             | (\$113,315) | (\$192,141) | (\$165,744) | (\$226,943) | (\$197,510) |
| To University                                       | (\$74,450)  | (\$318,088) | (\$271,477) | (\$200,635) | (\$265,880) |
| Royalties Undistributed                             | (\$13,682)  | (\$35,514)  | (\$28,577)  | (\$308,876) | (\$248,996) |

Note: Undistributed royalties arise predominantly from research assignment agreements requiring the completion of the term of research sponsorship prior to distribution.

**III. Summary of Fiscal Year 2004 Patent Activity**

**A. Fiscal Year 2004 Invention Disclosure And Associated Patent Activity**

Table 3 provides a summary of disclosure and patenting activity by major academic and research units.

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**TABLE 3. Disclosures By Major Academic and Research Units**

| <b>Academic or Research Unit</b>            | <b>Disclosures</b> | <b>Provisional Patents Filed</b> | <b>U.S. Patents Filed</b> |
|---|--------------------|----------------------------------|---------------------------|
| Arizona Cancer Center                       | 6                  | 2                                | 2                         |
| Arizona Research Labs                       | 3                  | 1                                | 0                         |
| BIO5  | 3                  | 1                                | 0                         |
| College of Agriculture and Life Sciences    | 16                 | 4                                | 2                         |
| College of Engineering                      | 22                 | 9                                | 1                         |
| College of Fine Arts                        | 1                  | 0                                | 0                         |
| College of Management                       | 1                  | 1                                | 0                         |
| College of Medicine                         | 21                 | 5                                | 1                         |
| College of Nursing                          | 1                  | 0                                | 0                         |
| College of Pharmacy                         | 12                 | 4                                | 0                         |
| College of Science                          | 7                  | 6                                | 0                         |
| College of Social & Behavioral Sciences     | 3                  | 0                                | 0                         |
| Units Under the Vice President for Research | 1                  | 1                                | 0                         |
| Optical Sciences                            | 11                 | 3                                | 2                         |
| School of Health Professions                | 3                  | 1                                | 0                         |

**B. Issued Patents**

The number of U.S. patents issued to ABOR on behalf of the University of Arizona increased to 18 and will continue to rise reflecting the increased resources and filings since fiscal year 2000. Some of the patents that were granted this year were:

- U.S. Patent 6,699,210 entitled, "Glaucoma Shunt and a Method of Making and Surgically Implanting the Same."
- U.S. Patent 6,611,372 entitled, "Erbium and Ytterbium Co-Doped Phosphate Glass Optical Fiber Amplifiers Using Short Active Fiber Length."
- U.S. Patent 6,610,809 entitled, "Polymer, Production Method Thereof, and Photorefractive Composition."
- U.S. Patent 6,610,854 entitled, "Substituted Condensation Products of N-Benzyl-3-Indenylacetamides with Heterocyclic Aldehydes for Neoplasia."
- U.S. Patent 6,689,775 entitled, "Uses of Thioredoxin."
- U.S. Patent 6,586,476 entitled, "Methods for the Treatment of Nephro-Disorders Using Amino-thiol Compounds."

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**IV. Summary of Fiscal Year 2004 Highlighted Activities**

**A. Startup Company Activity**

Five startup companies were formed in fiscal year 2004. Startups in this context refers to companies who have completed a license transaction with the OTT for intellectual property owned by ABOR on behalf of UA and which is foundational to the company.

- Topical Technologies – formed by Drs. Robert Dorr of Pharmacy and David Alberts of the Arizona Cancer Center to develop new topical agents for the prevention of skin cancer.
- Thinking in Music – formed by Dr. Laurie Taetle as a graduate student in the College of Fine Arts, a not-for-profit dedicated to expanding the delivery of a music-based education program developed at UA by the founder in conjunction with the School of Music and the Tucson Symphony Orchestra.
- TMI Laboratories – formed with Dr. Roy Ax to develop and commercialize new technologies for testing and treating human fertility problems.
- Montigen Pharmaceuticals – formed by former UA Cancer Center researcher Dr. David Bearss to commercialize novel compounds for the treatment of cancers.
- DMetrix – formed with Drs. Michael Descour and James Wyant of Optical Sciences to commercialize unique optical instrumentation for digital pathology and telemedicine.

**B. Licenses and Options Signed**

In addition to the startups outlined above, companies involved in technology adoption in fiscal year 2004 related to UA-developed innovations included large corporations such as Monsanto and Novartis, mid-stage companies such as Ventana Medical Systems and Cylene Pharmaceuticals, and a variety of small companies and organizations including publishers such as Desert Southwest Fitness. Innovations transferred under licenses or options include:

- Novel compounds for developing new cancer treatments.
- New methods and targets for agro-biotechnology.
- New vision technologies and associated materials.
- A variety of biological materials including antibodies and cell lines of use in developing new therapeutics or diagnostics.
- Software for optical system control.

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**C. Strategic Relationships**

The OTT builds and participates in relationships with a large number of organizations globally:

- **Centecor:** Joint technology development.
- **CONyCT (Mexico):** Bi-national education, research and technology transfer consortium with the government of Mexico led by the College of Science and the Eller College of Management.
- **Public Intellectual Property Resource in Agriculture (PIPRA):** A Rockefeller Foundation initiative with UA as one of the founding members creating a resource in intellectual property for the conduct of agricultural research.
- **Norwegian University of Science and Technology:** Joint research and development and commercialization activities related to proof of concept research on new semiconductor materials.
- **The Translational Genomics Research Institute:** Joint research and development and commercialization activities related to translational genomics in cancer.
- **University of California, Davis and Purdue University:** Commercialization agreement related to treatments for Valley Fever.

**D. Other Activities**

- The OTT continued its highly successful interactions with the Eller School of Business to commercialize select inventions and leverage internal relationships to extend the reach and relevance of technology transfer. Six teams of students from the McGuire Entrepreneurship Program performed evaluation studies on a number of UA technologies resulting in business plans. The OTT also aided the McGuire Program and the MBA program in expanded experiential exercises in high tech entrepreneurship including technology feasibility studies with Honeywell and with optics institutes in Mexico. The efforts by OTT personnel were acknowledged by the Karl Eller Center for Entrepreneurship by naming
  - The director of the OTT one of three 2004 Karl Eller Center Entrepreneurial Fellows; and
  - Michael Koerner, a senior licensing associate in the OTT, one of three 2004 Karl Eller Center Entrepreneurship Faculty Fellows.
- The OTT expanded outreach activities through collaboration with various units in the university and organizations in Arizona. Among them are:

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- The Arizona Center for Innovation (AzCI), a subsidiary of the UA Campus Research Corporation providing incubation and business acceleration services associated with the UA Science & Technology Park through joint marketing education and communication activities.
- The College of Agriculture and Life Sciences through joint graduate masters student appointments in science and technology management.
- The Southern Arizona Tech Council through promotion of cluster activities and the creation of mirror clusters at the university.
- The International Trade and Development Center through internship and planning opportunities.
- The Arizona Department of Commerce through joint planning and expertise for efforts to develop a new high tech portal for Arizona.
- The OTT worked closely with the University of Arizona Foundation Technology and Research LLC (UTR) to manage and enhance the substantial technology portfolio donated by P&G to the University of Arizona Foundation on behalf of the UA in the previous fiscal year. Progress in placing the donated portfolio was enhanced by new technology developed by UA researchers under a UTR research services agreement. The technology is being licensed to UTR for placement with the rest of the portfolio. At the close of fiscal year 2004, negotiations for licensing a lead cancer compound forming part of the portfolio were underway; they are expected to be concluded in fiscal year 2005.
- The OTT continues to build professional capacity in its operations. Stephen O'Neil, formerly director of technology transfer at the University of Colorado at Boulder, joined in December of 2003 as a the new OTT manager for outreach and special projects. A junior fiscal specialist, Susan Vesterdal, was added to address expanding needs in contract and fiscal management.
- The OTT staff continues the UA tradition of serving the community by donating their professional expertise. The director continued as the Western Region Vice President for the Association of University Technology Managers and member of its Board of Directors. Senior licensing staff serve as volunteers to Bio Industry Association of Southern Arizona, the American Chemical Society, and the Association of University Technology Managers.

## RECOMMENDATION/CONCLUSION

This report is provided as information to the Board.