

**EXECUTIVE SUMMARY**

**INFORMATION ITEM: FY 2006 UNIVERSITY TECHNOLOGY TRANSFER REPORTS**

**ISSUE:** As required by Board Policy 6-909.10, the Board will review the universities' technology transfer reports highlighting activities and performance for the fiscal year ending June 30, 2006.

**BACKGROUND:**

▶ The universities' FY 2006 technology transfer reports indicate the following data on a systemwide basis:

- 4% increase in invention disclosures—242 compared to 233 in FY 2005
- 4% decrease in U.S. patent applications—195 compared to 203 in FY 2005
- 16% increase in patents issued—36 compared to 31 in FY 2005
- 10% increase in licenses/options signed—66 compared to 60 in FY 2005
- 51% increase in revenue, generating \$5.6 million in FY 2006 compared to \$3.7 million in FY 2005

▶ The universities report the following technology transfer activity during FY 2006:

|                          | <b>ASU</b> | <b>%*</b> | <b>NAU</b> | <b>%*</b> | <b>UA</b> | <b>%*</b> | <b>TOTAL</b> | <b>%*</b> |
|--------------------------|------------|-----------|------------|-----------|-----------|-----------|--------------|-----------|
| Invention Disclosures    | 148        | 23%       | 6          | -45%      | 88        | -14%      | 242          | 4%        |
| U.S. Patent Applications | 87         | -12%      | 6          | 100%      | 102       | 1%        | 195          | -4%       |
| Patents Issued           | 20         | 5%        | 1          | -50%      | 15        | 50%       | 36           | 16%       |
| Licenses/Options Signed  | 39         | 39%       | 1          | -         | 26        | -19%      | 66           | 10%       |
| Revenue                  | \$3.8M     | 47%       | \$0.2M     | -         | \$1.7M    | 43%       | \$5.6M       | 51%       |

\*Percentage change from prior year

▶ ASU's report appears on pages 2-9 of this Executive Summary; UA's on pages 10-16; and NAU's on pages 17-20. Each university's report highlights other specific achievements.

**RECOMMENDATION:**

The universities' FY 2006 technology transfer reports are presented to the Board as an information item.

|                              |              |                           |
|------------------------------|--------------|---------------------------|
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**INFORMATION ITEM:** FY 2006 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 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 for the fiscal year ending June 30, 2006.

**BACKGROUND:**

This report provides an overview of historical data as well as the highlights of ASU's patenting and licensing activities for FY 2006. Through AzTE, ASU has accelerated the growth of its technology transfer initiatives by emphasizing technology licensing, start-up company formation, and proof-of-concept investment in promising discoveries. In FY 2006, some of AzTE's primary objectives included (1) increasing the number of invention disclosures, (2) increasing the number of new transactions, (3) increasing the number of start-up companies based on ASU technology, and (4) increasing commercialization revenue. AzTE accomplished or exceeded each of these stated objectives in FY 2006.

**DISCUSSION:**

**I. TECHNOLOGY TRANSFER STATISTICS FOR FY 2006 AND PRIOR YEARS**

Table 1 provides a current and historic overview of ASU's technology transfer activities for the five years ending June 30, 2006. In summary, for FY 2006 AzTE reports 148 new invention disclosures, 87 new U.S. patent applications filed, and 20 U.S. patents issued. In addition, 39 transactions involving ASU technology were executed in FY 2006.

**Table 1: Technology Transfer Statistics for FY 2002 through FY 2006**

|                          | FY 2006 |     | FY 2005 |    | FY 2004 |     | FY 2003 |     | FY 2002 |     |
|--------------------------|---------|-----|---------|----|---------|-----|---------|-----|---------|-----|
|                          | Actual  | %*  | Actual  | %* | Actual  | %*  | Actual  | %*  | Actual  | %   |
| Invention Disclosures    | 148     | 23  | 120     | 26 | 95      | 10  | 86      | -11 | 97      | 54  |
| U.S. Patent Applications | 87      | -12 | 99      | -8 | 108     | -18 | 132     | 22  | 108     | 57  |
| U.S. Patents Issued      | 20      | 5   | 19      | 6  | 18      | 6   | 17      | 55  | 11      | -27 |
| Licenses/Options Signed  | 39      | 39  | 28      | 40 | 20      | 222 | 9       | 0   | 9       | -18 |

\*Percentage change from prior year

**Contact:** Peter Slate, AzTE CEO 480-965-5787 pslate@azte.com

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**II. REVENUE AND DISTRIBUTIONS FOR FY 2006 AND PRIOR YEARS**

AzTE budgeted \$3,448,475 in operating expenses for FY 2006. Actual FY 2006 operating expenses were \$3,098,446 (net of legal reimbursements), approximately 10% below budget. AzTE continues to exercise greater scrutiny in patent filing decisions, primarily due to the Intellectual Property Review Process which was developed and implemented in FY 2005. **Table 2** summarizes financial data for ASU's technology transfer program for the five years ending June 30, 2006.

**Table 2: Technology Transfer Financial Data for FY 2002 through FY 2006**

| Revenue   | FY 2006            |           | FY 2005            |            | FY 2004            |            | FY 2003            |            | FY 2002            |            |
|---|--------------------|-----------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|
|   | Actual             | %*        | Actual             | %*         | Actual             | %*         | Actual             | %*         | Actual             | %          |
| <b>Total Licensing and Other Revenue</b>          | <b>\$3,779,750</b> | <b>47</b> | <b>\$2,565,399</b> | <b>80</b>  | <b>\$1,421,835</b> | <b>30</b>  | <b>\$1,092,784</b> | <b>-38</b> | <b>\$1,770,340</b> | <b>1</b>   |
| <b>Components of Total Revenue:</b>               |                    |           |                    |            |                    |            |                    |            |                    |            |
| Licensing Revenue                                 | \$3,377,805        | 57        | \$2,154,045        | 69         | \$1,275,961        | 17         | \$1,092,784        | -38        | \$1,770,340        | 1          |
| Licensee Legal Reimbursement                      | \$ 241,745         | 0         | \$ 241,979         | 100        | \$ 121,124         |            | N/A                |            | N/A                |            |
| Options and Other Revenue                         | \$ 160,200         | -5        | \$ 169,375         | 684        | \$ 24,750          |            | N/A                |            | N/A                |            |
| <b>Total Sponsored Research Generated by AzTE</b> | <b>\$ 570,289</b>  | <b>60</b> | <b>\$ 356,733</b>  | <b>-17</b> | <b>\$ 430,509</b>  | <b>-63</b> | <b>\$1,166,298</b> | <b>0</b>   | <b>\$1,163,001</b> | <b>-23</b> |
| <b>Royalty Distribution Summary:</b>              |                    |           |                    |            |                    |            |                    |            |                    |            |
| Royalties Distributed to Inventors                | \$(391,751)        | -32       | \$(576,768)        | 47         | \$(392,942)        | 14         | \$(345,357)        | -12        | \$(392,443)        | -24        |
| Royalties Distributed to Labs                     | \$(405,625)        | -31       | \$(588,248)        | 52         | \$(386,802)        | 14         | \$(340,384)        | -9         | \$(375,939)        | -36        |
| Royalties Retained by University                  | \$(383,589)        | -26       | \$(517,510)        | 40         | \$(368,542)        | 20         | \$(307,405)        | -2         | \$(312,932)        | -30        |

\*Percentage change from prior year

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**III. Summary of FY 2006 Patent Activity**

**A. Table 3** provides a breakdown of FY 2006 patent filing and issuance activity across ASU's academic departments to identify where technology patenting activity is concentrated.

**Table 3: FY 2006 Patent Activity by Department**

| <b>Department</b>                             | <b>Disclosures Received</b> | <b>Provisionals Filed</b> | <b>U.S. Non-Provisional Applications Filed</b> | <b>PCT<sup>3</sup> Applications Filed</b> | <b>Patents Issued</b> |
|---|-----------------------------|---------------------------|--|---|-----------------------|
| Biodesign Institute                           | 54                          | 8                         | 16   | 5   | 3                     |
| School of Life Science                        | 13                          | 10                        | 14   | 1   | 2                     |
| Chemistry/Biochemistry                        | 12                          | 7                         | 20   | 8   | 7                     |
| Communications/<br>Business                   | 3                           | 0                         | 0  | 0   | 0                     |
| Fulton School of<br>Engineering               | 58                          | 22                        | 38   | 4   | 10                    |
| Innovation Space-<br>School of Design         | 6                           | 0                         | 0  | 0   | 0                     |
| Polytechnic- Applied<br>Biological Sciences   | 3                           | 0                         | 9  | 0   | 0                     |
| Fulton College of<br>Education                | 1                           | 0                         | 0  | 0   | 0                     |
| Polytechnic-<br>Mechanical &<br>Manufacturing | 1                           | 0                         | 0  | 1   | 0                     |
| Phoenix- Office of<br>Youth Preparation       | 1                           | 0                         | 0  | 0   | 0                     |
| Flexible Display Center                       | 4                           | 0                         | 0  | 0   | 0                     |
| Phoenix- Fletcher<br>Library                  | 2                           | 0                         | 0  | 0   | 0                     |
| Physics/Astronomy                             | 8                           | 4                         | 7  | 2   | 1                     |
| School of Geographical<br>Sciences            | 1                           | 0                         | 0  | 0   | 0                     |
| <b>Totals</b>                                 | <b>167<sup>1</sup></b>      | <b>51<sup>1</sup></b>     | <b>104<sup>1</sup></b>                         | <b>21</b>                                 | <b>23<sup>2</sup></b> |

<sup>1</sup>Many inventions received have been conceived with cross-disciplinary efforts and, therefore, multiple departments can claim a particular disclosure or patent.

<sup>2</sup>U.S. and PCT Patents issued.

<sup>3</sup>PCT = Patent Cooperation Treaty: Global Applications with an 18-month life.

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### **B. Issued Patents**

The following are examples of patents that have been issued to ASU during FY 2006:

**Patent No. 6,942,855 Issued: 9/13/2005 Title: “Viral Vectors Having Reduced Virulence”**

**Inventors:** Bert Jacobs, Jeffrey Langland, and Sangeetha Vijaysri

The vaccinia virus genome contains nonessential regions into which exogenous DNA can be incorporated. Exogenous DNA can be inserted into the vaccinia genome by well-known methods of homologous recombination. The resulting recombinant vaccinia viruses are useful as vaccines and anticancer agents.

**Patent No. 7,012,124 Issued: 3/14/2006 Title: “Solid Polymeric Electrolytes for Lithium Batteries”**

**Inventors:** Charles Angell, Wu Xu, Xiaoguang Sun

This invention relates to a novel method for analyzing nucleic acid sequences based on real-time detection of DNA. Incorporation of a nucleotide base into the template system can be detected by any of a variety of methods including but not limited to fluorescence detection. Novel DNA sequencing presents vast opportunities in the life sciences and disease detection fields.

## **IV. Summary of FY 2006 Highlighted Activities**

The following overview provides more information on activities described above and highlights certain other AzTE activities and accomplishments during FY 2006:

### **A. Start-Up Company Activity**

- **BioSense International LLC:** BioSense International was formed with technology developed by Dr. Morteza Abbaszadegan, Professor of Civil and Environmental Engineering in the ASU Fulton School of Engineering. BioSense is a start-up company in the water instruments/monitoring and analytic testing business. The company is engaged in the design and manufacture of highly sophisticated electro-optical instruments and reagents used for the rapid detection and characterization of pathogens in liquids. BioSense's first products will rapidly detect microorganisms in liquids or bio-films. Their proprietary bio-chemical and electro-optical process currently takes between 10 and 60 minutes to complete. From this core technology, the company intends to develop two product lines, a testing instrument and a monitoring system.

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- **RSL Medical Systems:** Rose Street Lab Medical Systems is a medical device company that is commercializing a point-of-care product for rapid blood analysis of protein biomarkers associated with a wide range of conditions, including stroke and heart attack. The company's intellectual property includes breakthrough fiber optic sensing technology which is 3 to 10 times faster than competitive technologies. This licensed sensor technology was developed by Dr. Karl Booksh, Associate Professor of Chemistry and Biochemistry at ASU. The technology, referred to as FOSPR, utilizes fiber optics and antibodies to achieve accurate biomarker identification within 5 minutes or less, and with 60% less cost than other point-of-care diagnostic instrumentation.
- **constructNet International Inc.:** constructNet International Inc. (cNI) is a joint venture spinout company anchored by Arizona State University and Tecnológico de Monterrey (Tec), Mexico's largest private university. The company provides online- and classroom-based education, training services, and products to the construction industry worldwide and in many languages. It is the premier aggregator of U.S. construction education and training and utilizes electronic-media production expertise and international experience of Tech's Virtual University. cNI's target market is the global construction industry, initially concentrating on the trillion dollar U.S. construction sector. The company is poised to be the international industry standard for online construction education and training delivery systems through the leveraging of its founding institutions' respective networks.
- **Cantimer, Inc.:** Cantimer, Inc. has developed and is commercializing proprietary products that allow continuous and non-invasive salivary commonality measurements to service the largely untapped market of human hydration optimization. The company is developing a line of hydration sensors composed of a base module and replaceable polymer testing tips. The hydration sensor is based on patented technology exclusively licensed from Northern Arizona University. As the technology licensing company for NAU, AzTE negotiated the license agreement. NAU will summarize the terms of the deal in its FY 2006 Technology Transfer report.

### V. 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 2006. Examples include:

- **XL TechGroup:** Working with major international technology partners and leading universities, XL TechGroup first identifies global unmet market needs and then targets and exploits these by the systematic creation of successful, disruptive technology businesses. XL TechGroup optioned technology from AzTE that was developed by Drs. Qiang Hu and Milton Sommerfeld of the ASU School of Life Sciences. The technology creates a proprietary environmentally friendly algae that

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generates an estimated two hundred times more energy per acre than traditional biofuel crops, together with a process by which the technology can cost-effectively produce renewable petroleum-based products such as biofuel. XL TechGroup has sponsored research at ASU to develop the technology further.

- **Schneider Electric:** Schneider Electric is one of the world's leaders in power and control in the residential, building, industry, energy, and infrastructure markets. Schneider has licensed from AzTE technology developed by Dr. Jun Shen of the Department of Electric Engineering for magnetically actuated MEMS switches. The license terms include upfront payments, royalties, and milestones.
- **Entergy Corp:** Entergy Corporation is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, and it is the second-largest nuclear generator in the United States. Entergy has licensed technology referred to as PIPS (Performance Information Procurement System) to achieve greater optimization through performance algorithms. The technology was developed by Dr. Dean Kashiwagi of the ASU Del E. Webb School of Construction. The license terms were a one-time up-front license fee.
- **Stratosphere Solutions Inc:** Stratosphere Solutions provides innovative yield improvement products to semiconductor manufacturers through a holistic and collaborative approach that spans design and manufacturing. Stratosphere has licensed technology that helps enable manufacturers to accurately characterize process variations for sub-100 nanometer processes. The technology was developed by Sarma Vrudhala, Professor in the Department of Computer Science and Engineering. The license terms include up-front payments, royalties, and milestones.
- **Altela, Inc.:** Altela, Inc. provides products and services to customers in need of creating pure water from highly salinated and contaminated water sources. Through the use of its proprietary technology, Altela desalinates and decontaminates highly challenged water sources without the energy-intensive equipment, high temperatures, or high pressures of other water desalination technologies. Altela has licensed water purification technology developed at ASU known as "dewvaporation." The technology was developed by Dr. James Beckman, Associate Professor of Chemical and Materials Engineering at ASU. The license terms include up-front payments, royalties, and milestones.

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### VI. Other Activities

The following is an overview of some other AzTE activities for FY 2006:

- **Operational Achievements:** AzTE achieved significant milestones during FY 2006. These included: (1) 47% year-over-year revenue growth through industry-focused sales and marketing efforts; (2) 23% increase in new invention disclosures through enhanced faculty outreach programs; (3) four new spin-out companies launched with adequate seed-funding and competent management; and (4) continued scrutiny of new invention disclosures through AzTE's "IP Review Process" to optimize the expense management of all intellectual property emanating from ASU. Through the current programs and systems which have been implemented during the past two years, AzTE is well positioned for continuing success.
- **AzTE Catalyst Fund:** During FY 2006, AzTE continued to catalyze promising ASU technologies that were in need of additional funding to advance commercial opportunities. In FY 2006, AzTE invested a total of \$135,430 in 3 separate ASU inventions in diverse technology areas, including lithium ion batteries, electrorheological materials, and biodiesel fuel.
- **Steven Lisa Foundation Fellowship:** A new fellowship in patent law has been created at the ASU Sandra Day O'Connor College of Law, sponsored by Steven Lisa, a nationally recognized patent attorney and ASU alumnus. Selected fellows will work with Lisa and AzTE to help identify, prosecute, and license patents obtained on ASU's most commercially significant inventions. Lisa, who founded his own patent law firm in Chicago, is expected to contribute \$100,000 over five years through the Steven G. Lisa Foundation.
- **AzTE Spin-out Acquisitions:** During FY 2006, three AzTE spin-outs were acquired by outside companies located in Arizona. AzERx, a therapeutic drug company that has developed a compound that could help stroke victims, was acquired by Orthologic Corp. Neural Intervention Technologies, a company with a proprietary treatment method for aneurysms, was acquired by W.L. Gore & Associates. Molecular Imaging, a premier developer and supplier of atomic force microscopes and scanning probe microscope systems, was sold to Agilent Technologies, an \$8 billion leader in molecular testing equipment that plans to keep the acquired company based in Arizona.
- **AzTE Quasi-Endowment Fund:** In partnership with the ASU Foundation (ASUF), an endowment fund was created at the Foundation by AzTE in FY 2006. The fund was initially seeded with \$500,000 of retained earnings. AzTE will grow the fund through contributions of a percentage of equity proceeds as AzTE liquidates its equity positions in start-up companies. The Quasi-Endowment Fund will be used to fund strategic initiatives at AzTE and ASUF.

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- **Strategic International Business Development:** During FY 2006, AzTE staff traveled to Beijing and Shanghai China for investigation of collaboration opportunities with venture funds, universities, and corporate enterprises. AzTE now has key relationships in place with Draper Fisher Jurvetson (DFJ) Dragon fund, Shanghai University, Tsinghua University, and Suntech Solar. Additionally, AzTE co-hosted at ASU select representatives from Dublin City University to explore partnering opportunities in sensor technology.

### **RECOMMENDATION:**

This FY 2006 Technology Transfer Report for Arizona State University is provided as information to the Board.

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**INFORMATION ITEM:** FY 2006 ANNUAL 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 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 highlight the activities and performance in the area of technology transfer for the fiscal year ending June 30, 2006.

**BACKGROUND:**

The OTT continues to demonstrate the effectiveness of the investment in technology transfer activities undertaken by ABOR and UA. The focus of efforts in FY 2006 was to continue to enhance strong partnerships with internal and external organizations to leverage our resources, develop new outreach activities to the faculty and community, and increase the number of license-based relationships contributing to the success of UA and Arizona. The OTT focuses on a portfolio-based approach to licensing, emphasizing long-term returns to the University.

**DISCUSSION:**

**I. Technology Transfer Statistics for FY 2006 and Prior Years**

Table 1 summarizes the technology transfer statistics for the five years ending June 30, 2006. With a philosophy of "intellectual property by design," the OTT worked closely with the faculty to refine the standards on disclosure to improve quality and outcomes.

**TABLE 1: Technology Transfer Statistics for FY 2002 through FY 2006**

|                                | FY 2006 |     | FY 2005 |     | FY 2004 |     | FY 2003 |    | FY 2002 |     |
|--------------------------------|---------|-----|---------|-----|---------|-----|---------|----|---------|-----|
|                                | Actual  | %*  | Actual  | %*  | Actual  | %*  | Actual  | %* | Actual  | %*  |
| Invention Disclosures**        | 88      | -14 | 102     | 7   | 95      | -14 | 111     | 0  | 111     | 0   |
| U.S. Patent Applications Filed | 102     | 1   | 101     | 11  | 91      | 23  | 74      | 32 | 56      | -10 |
| U.S. Patents Issued            | 15      | 50  | 10      | -44 | 18      | 50  | 12      | 50 | 8       | -11 |
| Major Agreements ***           | 42      | -11 | 47      | 21  | 39      | 44  | 27      | 8  | 25      | -4  |
| Licenses/Options Signed        | 26      | -19 | 32      | 28  | 25      | 4   | 24      | 33 | 18      | -14 |

\* Percentage change from prior year.

\*\* In FY 2006, the OTT tightened standards for technical completeness of disclosures, resulting in 88 technically complete disclosures from the 99 received in FY 2006.

\*\*\* Major Agreements are those requiring significant licensing staff time to negotiate, including Licenses, Options, Inter-Institutional Agreements, Master, or other agreements.

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In FY 2006, the OTT licensing staff, represented by slightly less than 4 licensing full time equivalents (LFTE), executed 42 major transactions, which included 26 licenses and options with companies across the technology spectrum, 3 of which were start-ups. Major transactions involve considerable effort by licensing professionals to execute; start-ups conform to the Association of University Technology Managers (AUTM) definition where the license to the company is signed and technology involved is foundational to the creation of the company.

AUTM survey numbers (Licenses and Options Signed) do not count transactions in support of the research enterprise such as Patent Donation Agreements or Inter-Institutional Agreements that consolidate patent rights among universities for licensing. In particular, in FY 2006 there were 16 agreements not counted in the AUTM number which support those activities. 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.

A focus on improving the quality of disclosure to the office resulted in a lower number of disclosures in FY 2006 when compared to 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 more patent filings and transactions per disclosure. An increase in the number of issued patents has followed an increase in patent applications, but the time lag due to Patent Office proceedings is a long one, and FY 2006 patent issuances still do not fully incorporate the positive effects of an increased filing rate over the last several years.

With an eye on future licensing potential, the OTT negotiated over 47 Confidential Disclosure Agreements, 28 outbound Biological Material Transfer Agreements, and 5 Letters of Understanding. These contracts enable UA to disclose proprietary technology or make proprietary materials available to companies and other institutions for non-commercial use, as a possible first step in formal adaptation and commercial licensing by the recipients. The OTT continues to facilitate sponsored research in several ways, including assisting the UA Office of Research and Contract Analysis (ORCA) in complex or difficult intellectual property negotiations. For inventions made with federal grants, the OTT is responsible for reporting to the granting agency.

## **II. Revenue and Distributions for FY 2006 and Prior Years**

Table 2 presents the five-year financial summary for technology transfer. FY 2006 royalties increased to \$1.7 million on receipt of a substantial milestone payment as a major drug to treat sexual dysfunction approaches market readiness. Legal cost recoveries for expenditures in past years as part of transactions remained above 75% of the OTT's current legal expenditures of roughly \$500,000. Expenses as a combination of operational and legal expenditures remained at approximately \$1.5 million.

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**Table 2: Technology Transfer Financial Data by Fiscal Year**

|   | FY 2006       |     | FY 2005     |     | FY 2004     |     | FY 2003     |     | FY 2002     |     |
|---|---------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
|   | Actual        | %*  | Actual      | %*  | Actual      | %*  | Actual      | %*  | Actual      | %*  |
| <b>Total Royalty Revenue</b>                        | \$1,688,857   | 43  | \$1,175,915 | 17  | \$1,008,621 | -6  | \$1,076,870 | 51  | \$714,415   | -14 |
| Running Royalties & Annuities                       | \$551,047     | -14 | \$640,342   | 32  | \$483,835   | -16 | \$578,466   | 63  | \$354,553   | -10 |
| One-Time fees including option fees                 | \$1,137,810   | 99  | \$571,573   | 9   | \$524,786   | 5   | \$498,404   | 38  | \$359,862   | -18 |
| Legal Cost Recoveries                               | \$423,302     | .01 | \$425,351   | 28  | \$332,075   | 20  | \$277,401   | 302 | \$68,968    | 50  |
| <b>Total Sponsored Research Generated by UA OTT</b> | \$718,900     | 20  | \$598,669   | -29 | \$847,175   | 38  | \$615,527   | N/A | N/A         | N/A |
| <b>Expenses, Cost Recovery, and Distributions</b>   |               |     |             |     |             |     |             |     |             |     |
| Personnel & Operations                              | (\$1,024,217) | 7   | (\$955,655) | 22  | (\$781,749) | 4   | (\$748,524) | N/A | N/A         | N/A |
| Legal Expenses                                      | (\$481,250)   | -13 | (\$552,404) | 13  | (\$488,535) | 33  | (\$365,990) | 26  | (\$289,780) | 25  |
| Royalty Distribution Summary                        |               |     |             |     |             |     |             |     |             |     |
| Inventors   | (\$608,540)   | 70  | (\$358,706) | 21  | (\$296,265) | -13 | (\$340,416) | 37  | (\$248,617) | -14 |
| Laboratories & Units                                | (\$496,125)   | 157 | (\$193,150) | -2  | (\$197,510) | -13 | (\$226,943) | 37  | (\$165,744) | -14 |
| University  | (\$472,914)   | 22  | (\$388,876) | 46  | (\$265,880) | 33  | (\$200,635) | -26 | (\$271,477) | -15 |
| Royalties Undistributed                             | \$111,278     | -53 | \$235,183   | -6  | \$248,996   | -19 | \$308,876   | 981 | \$28,577    | -20 |

\* Percentage change from prior year

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

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**III. Summary of FY 2006 Patent Activity**

**A. FY 2006 Invention Disclosure and Associated Patent Activity**

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

**TABLE 3: FY 2006 Invention Disclosures by Major Academic and Research Units**

| Academic or Research Unit                        | Disclosures Received | U.S. Provisional Patents Filed | U.S. Non-Provisional Patents Filed | PCT <sup>1</sup> Applications Filed | U.S. Patents Issued |
|--|----------------------|--------------------------------|------------------------------------|-------------------------------------|---------------------|
| College of Agriculture & Life Sciences           | 11                   | 9                              | 5                                  | 10                                  | 4                   |
| College of Architecture & Landscape Architecture | 1                    | 1                              | 0                                  | 0                                   | 0                   |
| College of Engineering & Mines                   | 8                    | 12                             | 5                                  | 4                                   | 1                   |
| College of Fine Arts                             | 1                    | 0                              | 0                                  | 0                                   | 0                   |
| College of Medicine                              | 23                   | 24                             | 13                                 | 12                                  | 5                   |
| College of Optical Sciences                      | 29                   | 20                             | 2                                  | 1                                   | 4                   |
| College of Pharmacy                              | 19                   | 19                             | 2                                  | 11                                  | 3                   |
| College of Science                               | 20                   | 18                             | 5                                  | 4                                   | 7                   |
| BIO5 Institute                                   | 35                   | 32                             | 15                                 | 16                                  | 4                   |
| <b>Total</b>                                     | <b>147</b>           | <b>135</b>                     | <b>47</b>                          | <b>58</b>                           | <b>28</b>           |
| Total Unique Disclosures or Patents              | 88                   | 76                             | 26                                 | 32                                  | 15                  |

Note: Disclosures and patents may involve more than one academic unit, especially in interdisciplinary areas.

<sup>1</sup>PCT = Patent Cooperation Treaty: Global Applications with an 18-month life.

**B. Issued Patents**

Some of the patents that were granted in FY 2006 were:

- U.S. Patent Number 6,987,025 entitled “Dwf4 Polynucleotides, Polypeptides and Uses Thereof”
- U.S. Patent Number 6,983,667 entitled “Impact Micro-Positioning Actuator”
- U.S. Patent Number 6,992,071 entitled “Methods for Modulating Phototoxicity”
- U.S. Patent Number 7,022,712 entitled “Solubilization of Weak Bases”
- U.S. Patent Number 7,067,230 entitled “Photorefractive Composite”
- U.S. Patent Number 7,038,111 entitled “Method for Increasing Stress Tolerance in Plants”
- U.S. Patent Number 7,015,052 entitled “Method for Fabricating Organic Light-Emitting Diode and Organic Light-Emitting Diode Display Using Screen-Printing”

## EXECUTIVE SUMMARY

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### IV. Summary of FY 2006 Highlighted Activities

#### A. Start-Up Company Activity

Three start-up companies were formed in FY 2006, with several other transactions carrying across into FY 2007. Start-ups in this context refer to companies who have completed a license transaction with the OTT for intellectual property owned by ABOR on behalf of UA and that the technology transferred is foundational to formation of the company.

- Senestech focuses on applications of a method for chemical sterilization to create animal models for women's health issues and the humane sterilization of female animals. The company is located in Flagstaff, Arizona, and the researchers are Drs. P. Hoyer of UA and L. Mayer and C. Dyer of NAU.
- SharMoore Children's Productions is dedicated to the delivery of a new educational program for improving K-6 reading and writing skills to Arizona's schools. The company is located in Tucson, Arizona, and involves UA Theater Arts and Education graduate students S. O'Brian and S. Moore.
- S.A.F.E. Research and Development, LLC focuses on developing and providing new products for the U.S. honey bee industry. The company is located in Phoenix, Arizona, and the researcher is Dr. F. Ahumada-Segura.

#### B. Licenses and Options Signed

In addition to the start-ups outlined above, companies involved in technology adoption in FY 2006 included: (1) large corporations, such as Genzyme Corporation and ThermoFinnigan Corporation; (2) mid-stage companies such as Farming Intelligene; and (3) a variety of small companies and organizations, including local Tucson companies such as BioVigilant Corporation. The range of innovations transferred under licenses or options include:

- An algorithm and implementation for mining mass spectral data to detect specific chemical species, such as proteins, in complex mixtures.
- New targets for drug development for the treatment of pancreatic cancer.
- A method for evaluating ceramic material toughness and properties.

## EXECUTIVE SUMMARY

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- A method for inducing ovarian failure in mammals applicable to models of women's health and humane sterilization of animals.
- Treatments for parasitic diseases in animals.
- New optical component designs and methods for manufacture.
- Novel compounds for a new class of less addictive analgesics.

### C. Strategic Relationships

The OTT builds and participates in relationships with a large number of organizations, such as:

- **For the Udall Center's Native American Leadership Institute:** Joint distribution agreements with public broadcasting and Native American broadcasting organizations.
- **Unisys Corporation:** A teaming agreement for joint collaboration on research.
- **The Ewing Marion Kauffman Foundation:** A major grant related to new models of working with Angel investors and entrepreneurship.
- **Phelps Dodge Corporation:** A master agreement related to research and development activities related to mining research.

### 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. Teams of students from the McGuire Entrepreneurship Program performed evaluation studies on a number of UA technologies, resulting in four business plans. The OTT staff also aided the McGuire Program and the MBA program in expanded experiential exercises in high tech entrepreneurship.
- The OTT continued outreach and other activities through collaboration with various units in the University and organizations in Arizona. Among them are:
  - i. The Arizona Center for Innovation (AzCI), a subsidiary of the UA Campus Research Corporation which provides incubation and business acceleration services associated with the UA Science & Technology Park, through joint marketing education and communication activities.

## EXECUTIVE SUMMARY

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- ii. The College of Science through support of graduate masters student appointments in OTT for the professional science masters program.
  - iii. The Southern Arizona Tech Council through promotion of cluster activities.
  - iv. The Arizona Department of Commerce through joint planning and expertise for efforts to develop resources in support of technology transfer activities within Arizona, as well as participation in the Arizona Pavilion for the BIO meeting.
  - v. The Flinn Foundation through participation in capital formation planning and other activities related to the Biosciences Roadmap.
- The OTT staff continues to provide service both to the state of Arizona and nationwide through volunteer professional service activities. In FY 2006 OTT staff members were frequent volunteer speakers at local events and participated in organizing external activities, such as BIOSA's "Talk to An Angel" event conducted with Tucson's Desert Angels investor group and the annual Arizona BIO meeting. Senior licensing associates contributed their time in professional development activities for AUTM and in mentoring student entrepreneurs within the University. In FY 2006 Dr. Patrick Jones, Director, OTT, became the President-elect of AUTM, the 3,500-member international professional society for academic technology transfer. (Note: Dr. Jones assumed the AUTM Presidency in March 2007.)

### **RECOMMENDATION:**

This FY 2006 Technology Transfer Report for The University of Arizona is provided as information to the Board.

**EXECUTIVE SUMMARY**

**INFORMATION ITEM: FY 2006 REPORT ON TECHNOLOGY TRANSFER AT NORTHERN ARIZONA UNIVERSITY**

**ISSUE:** This University Technology Transfer Report is submitted in compliance with Article G of ABOR Policy 6-909-10 "Technology Transfer Policy." The purpose of this report is to highlight the activities and performance of Northern Arizona University and Arizona Technology Enterprises (AzTE), the technology commercialization and intellectual property management company for Arizona State University, in the area of technology transfer for the fiscal year ending June 30, 2006.

**BACKGROUND:**

NAU's technology transfer program continued to develop during FY 2006. A major goal of NAU's technology transfer program continues to be to seek opportunities to collaborate with the corporate sector, as well as more fully develop the technology transfer enterprise. To meet this goal, campus activities continue to increase awareness of faculty, staff, and students regarding ABOR intellectual property policies and potential prospects for technology transfer.

**DISCUSSION:**

**I. TECHNOLOGY TRANSFER STATISTICS FOR FY 2006 AND PRIOR YEARS**

Table 1 provides historical and current data for the five years ending June 30, 2006, summarizing the state of the technology transfer program at NAU. NAU reports 6 new patent filings and a decrease in invention disclosures from 11 in 2005 to 6 in 2006. One new patent and one new license were issued during FY 2006.

**Table 1: Technology Transfer Statistics for FY 2002 through FY 2006**

|                          | FY 2006 |     | FY 2005 |      | FY 2004 |      | FY 2003 |     | FY 2002 |     |
|--------------------------|---------|-----|---------|------|---------|------|---------|-----|---------|-----|
|                          | Actual  | %*  | Actual  | %*   | Actual  | %*   | Actual  | %*  | Actual  | %*  |
| Invention Disclosures    | 6       | -45 | 11      | 450  | 2       | -50  | 4       | -50 | 8       | 166 |
| U.S. Patent Applications | 6       | 100 | 3       | 200  | 1       | -75  | 4       | 0   | 4       | 33  |
| Copyright Registrations  | 1       | --  | 0       | -100 | 4       | 300  | 1       | 0   | 1       | --  |
| Patents Issued           | 1       | -50 | 2       | 100  | 1       | 0    | 1       | 0   | 1       | --  |
| Licenses/Options         | 1       | --  | 0       | --   | 0       | -100 | 1       | 0   | 1       | --  |

\*Percentage change from prior year

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**II. REVENUE AND DISTRIBUTIONS FOR FY 2006 AND PRIOR YEARS**

**Table 2** summarizes the financial picture for Northern Arizona University's technology transfer program for the five years ending June 30, 2006.

**Table 2: Technology Transfer Financial Data for FY 2006**

|   | FY 2006   |    | FY 2005   |     | FY 2004   |      | FY 2003   |     | FY 2002   |     |
|---|-----------|----|-----------|-----|-----------|------|-----------|-----|-----------|-----|
|   | Actual    | %* | Actual    | %*  | Actual    | %*   | Actual    | %*  | Actual    | %*  |
| Gross licensing revenue   | \$170,000 | -- | 0         | --  | 0         | --   | 0         | --  | 0         | --  |
| Less actual legal fees expended   | \$90,142  | 0  | \$90,104  | -25 | \$119,809 | 141  | \$49,706  | 405 | \$9,839   | -45 |
| Less royalty distributions to inventors                                 | \$18,469  | -- | 0         | 0   | 0         | 0    | 0         | 0   | 0         | 0   |
| Less technology transfer research fund contribution ("lab shares")      | N/A       |    | N/A       |     | N/A       |      | N/A       |     | N/A       | N/A |
| Plus indirect cost recovery from technology transfer research contracts | \$375,000 | -1 | \$378,507 | 52  | \$249,595 | 11   | \$225,797 | 35  | \$167,236 | 62  |
| Less technology transfer operating expenses                             | 0         | -- | 0         | --  | 0         | --   | 0         | --  | 0         | --  |
| Remainder for operations  | \$436,389 | 51 | \$288,403 | 122 | \$129,786 | -26  | \$176,091 | 12  | \$157,397 | 84  |
| Additional revenue from technology transfer contracts                   | 0         | 0  | 0         | 0   | 0         | -100 | \$729,000 | 847 | \$77,000  | --  |

\*Percentage change from prior year

N/A = Not Applicable

**EXECUTIVE SUMMARY**

**III. SUMMARY OF FY 2006 ACTIVITIES**

**Table 3** provides a breakdown in FY 2006 patent filing and issuance activity across NAU's academic departments where technology transfer activity occurred.

**Table 3: FY 2006 Patent Activity by Department**

| <b>Department</b>                         | <b>Disclosures</b> | <b>Patent Applications</b> | <b>Copyright Registrations</b> | <b>Patents Issued</b> | <b>Licenses/Options</b> |
|---|--------------------|----------------------------|--------------------------------|-----------------------|-------------------------|
| Biological Sciences                       | 1                  | 5                          |                                | 1                     |                         |
| Chemistry                                 |                    | 1                          |                                |                       |                         |
| Electrical Engineering                    | 3                  |                            |                                |                       |                         |
| Physics and Astronomy                     |                    |                            |                                |                       | 1                       |
| Physical Therapy                          |                    |                            |                                |                       |                         |
| School of Hotel and Restaurant Management | 2                  |                            | 1                              |                       |                         |
| <b>TOTALS</b>                             | <b>6</b>           | <b>6</b>                   | <b>1</b>                       | <b>1</b>              | <b>1</b>                |

**A. Intellectual Property (IP) Disclosures**

NAU faculty filed 6 IP disclosures in FY 2006. Three of these disclosures came from engineering faculty, two from the school of Hotel and Restaurant Management, and one from Biology. The disclosures for Hotel and Restaurant Management focus on on-line training in hotel management. The Biology disclosure focuses on a rapid mixing device for subsecond analysis of cell surface kinetics in flow cytometry.

**B. Patent Applications**

The Department of Biological Sciences filed for 5 patents in FY 2006. Among these filings are two from the MGen Lab (Keim) for typing mycobacterium tuberculosis and bacillus anthracis. Two applications are related to physiology and exercise science: an eccentric ergometer and a below elbow dynamic supination splint. A fifth application was filed for augmentative cursor technology through interactive vision.

**C. Issued Patents**

One patent was issued in FY 2006. This patent was to the MGen Lab (Keim et al.) for a "High Resolution Typing System for Pathogenic Mycobacterium."

**D. Licenses**

One license was issued to Cantimer to develop patented process of hydration detection with nano-sensors and a hand-held device. This technology also has potential for detecting bio-molecules, poison gases, and water contamination. This license is described in the AzTE report for ASU.

**EXECUTIVE SUMMARY**

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**E. Copyrights**

One copyright was issued for an online training and certification program related to hotel and restaurant management.

**IV. MOU WITH ASU TO SUPPORT TECHNOLOGY TRANSFER AT NAU**

NAU signed a formal agreement to designate AzTE as its Technology Transfer office on January 19, 2006. AzTE provides NAU with the necessary technology transfer professional support staff. The new agreement is 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 also benefits from this MOU through a reduction in overall costs, as well as the prevention of program duplication.

**V. IMPLEMENTATION OF ABOR POLICY AT NAU**

NAU's Intellectual Property Committee is developing documents to explain ABOR policy on intellectual property, including disclosure procedures, ownership rights, patent filings, copyrights, and commercialization possibilities. Dr. William Grabe, Interim Vice-Provost for Research & Graduate Studies, currently serves as the Intellectual Property Official for NAU and as a member of the Intellectual Property Committee, as well as the NAU point of contact regarding intellectual property issues.

**RECOMMENDATION:**

This FY 2006 Technology Transfer Report for Northern Arizona University is provided as information to the Board.