Technology Transfer at ASU

Arizona Technology Enterprises
November 2010
Mission

AzTE supports ASU’s research, education, public service and economic development mission by:

• Accelerating use-inspired innovation from ASU labs to the marketplace for the benefit of society
• Facilitating collaborations with industry for the development of next-generation technologies
• Promoting economic growth in Arizona through licensing and start-up company formation
AzTE Corporate History and Background

• Organized in May 2003 as a separate limited liability company under Arizona state law
• ASU Foundation is the sole member
• A tax-exempt nonprofit organization
• Governed by a separate Board of Directors (with ASUF and ASU members)
• Acts as ASU’s exclusive IP management organization
Our Team ~ Our Focus

AZTE is an organization (including 5 PhDs, 4 MBAs, 3 JDs) with over 135 years of technology commercialization experience.
AzTE Staff

• Top-tier staff with >130 years relevant experience

• Staff knowledge:
  – Research and development
  – Technology commercialization
  – Licensing
  – Venture investing
  – C-level leadership
  – Academic experience

Augustine Cheng, J.D.
Managing Director and Chief Legal Officer
Columbia University, Cravath, Swaine & Moore

Kenneth Polasko, Ph.D.
VP of Business Development, Physical Sciences
UCLA, Motorola, GE

Jack Geltosky, Ph.D.
VP of Business Development, Life Sciences
Bristol Myers Squibb, SmithKline Beecham

Charlie Lewis
VP of Venture Development
Arris Ventures and Paradise, Tritium Technologies, ANVT, Midas Computers

Bill Loux
Director, Physical Sciences
Honeywell Aerospace, Los Alamos National Labs

Jeremy Burdon, Ph.D.
Director, Physical Sciences
Medtronic, Motorola

Jill Uhl, J.D.
VP of Legal Affairs
Serono Pharmaceuticals, Nixon Peabody
Tech Transfer | AzTE Services

- IP identification, development and protection
- Commercial due diligence
- Marketing activities
- Licensing and other commercialization
- Spin-out ventures
- Corporate research collaborations
AzTE Business Model

- Deal-based business model (i.e., more selectivity in patenting activities based on deal potential), but management discretion to make high-risk patent investments for key initiatives, projects and faculty
  - Activities/practices not based on chase for revenue blockbusters or avoidance of missed opportunities
  - Discretion to release inventions to university faculty
- Less focus on new deal income (upfront payments) just to cover operational costs
  - Strategic emphasis on potential downstream revenue (e.g., equity, milestone payments and royalties): long-term bets
  - For faculty spin-outs, no requirement of burdensome upfront licensing fees
    1. Modest upfront fee and patent expense reimbursement
    2. Require diligence milestones and royalty payments but, in many cases, these will be set at the lower to mid-range of fair industry value
- Seek fair but not necessarily maximum value to facilitate rapid dissemination of ASU inventions and discoveries into the market
  - Speed over highest value
  - Deal turnover instead of optimizing a few
AzTE Outcomes – FY2010

• 4 spinout companies based on ASU IP
• 61 licenses or options to ASU technology
• 166 new U.S. patent applications filed (17 issued)
• 187 new invention disclosures
• Facilitated ~$6M in industry-sponsored research
• Cross marketing agreement with eight major Japanese universities represented by Japan Technology Group
AzTE Outcomes – Lifetime

- 40 spinout companies based on ASU IP
- 6 ASU companies acquired or merged: AzERx, ASU Photovoltaic Testing Laboratory, Magfusion, Molecular Imaging, Molecular Profiling Institute, and Neural Intervention Technologies
- 2 IPOs: Helicos BioSciences Corp. and PetroAlgae Inc.
- $1.24 million in ASU Catalyst funds invested in early-stage ASU technologies
- $16.5 million in commercialization revenue
- 240 active U.S. patents in portfolio
Impact | Before & After AzTE’s Formation

Technology Transfer Funnel

Research Expenditure - Federal, State, Industry, and University

Faculty Member or Graduate Student New Invention

TTO Decides to File A Patent

License to Existing Companies
License to Start-ups

Market
• IP identification, development, and protection
• Commercial due diligence
• Marketing activities
• Licensing and other commercialization
• Spin-out ventures
• Corporate research collaborations
Technology Commercialization Process Flow and Timeline

**INITIAL DISCLOSURE**
- 21 days

**TECHNOLOGY REVIEW**
- 60 days

**GO / NO-GO**

**PATENT PROSECUTION**
- Provisional Application: 9 months
- Utility / PCT Review: 18-36 months
- File Patent Application: 9 months

**BUSINESS DEVELOPMENT**
- Market Technology: 12-18 months
- Licensing Path: 30 days
- Target Licensees: 9 months
- Market to Licensees
- License / Hold / Drop & Release*
- Start-Up Path
- Target Investors
- Investor Discussions
- Start-Up / Hold / Drop & Release*

* Release requires inventors to agree to Arizona Board of Regents (ABOR) requirements.

**Average Patent Costs**
- Provisional filing: $5,000-$10,000
- Patent - Life Sciences: $164,000-$200,000
- Patent - Physical Sciences: $177,000-$216,000
External Invention Marketing

• Direct and Co-Marketing
  – Partnerships: University of Pennsylvania, Tecnológico de Monterrey, Dublin City University, University of Manchester, Japan Technology Group

• Company Visits

• AzTE & Industry Events

• Newsletter & Public Relations

• Email

• Web
Venture Catalyst at ASU

Venture Catalyst helps faculty, students and ASU-linked companies launch new startups or accelerate existing ventures:

- **Faculty** – Expert assistance in managing and commercializing discoveries
- **Students** – Expertise and experience to accelerate venture ideas
- **U.S. Companies** – Business growth with links to ASU
- **Global Ventures** – Personalized soft-landing services

**Entry points:**

- **Online assessment** – asuventurecatalyst.org/assessment
- **Entrepreneur office hours** – asuventurecatalyst.org/eoh

**Complete services:**

- Mentoring
- Funding Connections
- Intellectual Property Assistance
- Workforce Development
- Educational Opportunities
- Business Services (market research, investor presentations, etc.)
New Company Start-Up Process

PI interested in creating start-up company

PI contacts AzTE (Charlie Lewis) to discuss start-up

PI creates NewCo

NewCo and AzTE negotiate license agreement

AzTE seeks formal ABOR approval through submission of prepared documents

AzTE seeks preliminary approval of the economic terms of the license with ABOR

AzTE consults with ASU Office of General Counsel (OGC) to approve the license agreement

PI updates Annual Questionnaire with ASU's Office of Research Integrity and Assurance (ORIA)

AzTE seeks formal ABOR approval through submission of prepared documents

ABOR's decision reflected in the ABOR meeting minutes available online at www.azregents.edu

NewCo is launched with AzTE IP license terms

Venture Catalyst assists NewCo in achieving commercial success

PI will receive revenue distribution from royalties received by AzTE (ABOR 6-908, ASU RSP 604), but PI, as an equity holder, will not receive revenue distribution from the sale of equity held by AzTE.

Notes:
1. PI updates Annual Questionnaire with ASU’s Office of Research Integrity and Assurance (ORIA) to assist.
2. Documents are Executive Summary, Conflict of Interest Disclosure, and President’s Certification. AzTE assists in the preparation of the documents; ORIA will work with the PI to manage conflicts of interest (if any) and coordinate with ASU’s Office of General Counsel.
Sample Spinouts / Licenses

Axon – Programmable Metallization Cell is next-gen low-power semiconductor memory technology. It has been sublicensed to Micron Technology, Adesto and Qimonda.

EndoStim – Licensed ASU “microstimulator” technology for creation of devices to treat acid reflux disease and urinary incontinence. Closed on $6M in Series B funding in summer 2010.


Heliae – Heliae closed a $4M private and public financing round in 2008 and has leased space at SkySong. Heliae has licensed algal strains that convert a significant portion of their cellular mass into a type of oil that closely mirrors the length of the hydrocarbon chains found in kerosene.

Nayalogic – Nayalogic has developed a new digital circuit architecture and design technology that significantly reduces power consumption without sacrificing performance. It now seeks a technology partner to jointly develop products in the wireless mobile communications space.

SJT Micropower – Next generation battery power regulation chip for portable electronics extends battery life for portable electronics. SJT has received over $2M since 2005 in SBIR/STTR funding.

TUV Rheinland PTL – Joint venture founded in August, 2008. TUV Rheinland Group and ASU/AzTE formed TUV Rheinland PTL, a comprehensive, sophisticated, state-of-the-art facility for testing and certification of solar energy equipment.
ASU’s Intellectual Property Portfolio
50% of the Portfolio is Semiconductor and Materials

ASU Portfolio Overview Statistics

- 332 active cases = 100%
- 96 licensed = 29%
- 44 on hold = 13%
- 25 in negotiation = 8%
- 17 jointly owned = 5%
- 150 unlicensed = 45%

29% of the Portfolio is Licensed

ASU Portfolio Overview Statistics

- 96 cases licensed:
  - 66 exclusive
  - 30 non-exclusive
ASU Portfolio Overview Statistics

- 310 active cases
- 56 licensed
- 48 on-hold or in review
- 6 in negotiation
- 16 jointly owned
- 184 unlicensed

Instrument/Device Innovations Comprise 31% of the Portfolio

ASU Portfolio Overview Statistics

56 cases licensed:
- 52 exclusive
- 4 non-exclusive

17% of the Portfolio is Licensed
IP Portfolio: Fuel Cell, Solar, Biofuel, and Energy Storage

ASU Energy Highlights

- Over 1,200 energy related research faculty and staff
- ASU algae/biofuels listed as one of *Time Magazine’s top 50 inventions of 2008*
- ASU has 5 awards from DOE’s Solar America Initiative, one of the highest in the nation
- ASU’s solar testing lab combined with TUV Reinland creating the largest solar testing company in North America

Selected ASU Energy Technologies

- High yielding algae platform for bio-diesel and jet fuel
- High yielding cyanobacteria platform for biofuels
- \( \text{ZrB}_2/\text{Si} \) for LED substrates
- Multijunction concentrator solar cell on Si substrate
- Multijunction concentrator solar cell with tunable 0.8-1.2 ev GeSiSn layer
- Continuous band gap CdSSe solar cells
- Membraneless micro fuel cell
- Microbial fuel cell utilizing bacteria as the anode catalyst
- Novel organic materials for photovoltaics and LEDs
- Ultra-high efficiency low dropout regulators
- Ultra low-power threshold logic design tool
- High ionic conductivity electrolyte for Li-ion batteries
- Crumb rubber concrete

Energy Related Disclosure Trend