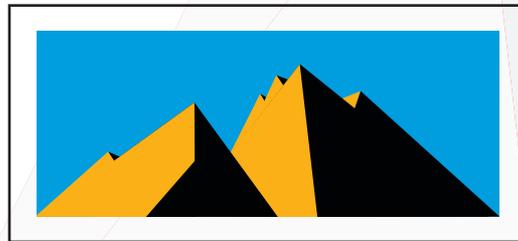


2002 STRATEGIC PLAN

BUILDING A WORLD-CLASS TECHNOLOGY TRANSFER OPERATION

UNIVERSITY OF COLORADO



**TECHNOLOGY TRANSFER**  
UNIVERSITY OF COLORADO

*Knowledge • Innovation • Technology*

JUNE 2002



<b>1</b>	<b>Executive Summary</b>
<b>2</b>	<b>Messages from the President and Vice President for Academic Affairs</b>
<b>3</b>	<b>Introduction</b>
<b>4</b>	<b>Technology Transfer at CU</b>
<b>5</b>	<b>Benchmarking CU Technology Transfer Performance</b>
<b>6</b>	<b>Strengths, Weaknesses, Opportunities, and Threats</b>
<b>7</b>	<b>Strategic Thrusts</b>
<b>7</b>	<b>Implementation and Timeframes</b>
<b>10</b>	<b>Financial Model</b>
<b>11</b>	<b>Measurable Outcomes</b>
<b>12</b>	<b>Conclusion</b>

Allen, David N.,  
Strategic Plan for the University of Colorado Technology Transfer Office  
(Boulder, CO; June 2002)  
Copyright © 2002 The Regents of the University of Colorado  
All rights reserved.  
For additional information, visit [www.cu.edu/techtransfer](http://www.cu.edu/techtransfer).

The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to and treatment and employment in its educational programs and activities.

## EXECUTIVE SUMMARY

The University of Colorado is undergoing a transformation in the first decade of this century that will leave few processes, departments, and laboratories untouched. Indeed, “business as usual” is no longer acceptable as President Elizabeth “Betsy” Hoffman exhorts each campus administrator, faculty researcher, staff member, and student to tear down the walls that impede progress and work together to answer “the great unanswered questions” to achieve even greater recognition as the premiere U.S. public university.

Knowledge is key to this process; therefore, many of CU’s departments are evaluating themselves in an effort to learn where they lead and where they fall behind. The CU Technology Transfer Office (TTO) is involved in its own process of breaking down the walls that have existed between it and its partners—faculty inventors and researchers on all four campuses, student innovators, and business leaders who are service providers and potential licensees. Technology transfer has become a priority at CU because, when managed effectively, technology transfer has the power to significantly impact society by bringing needed knowledge and innovation to commerce where it translates into products, services, and jobs.

In 2002, TTO has new leadership and a renewed commitment to bringing the resources of the university to bear on technology transfer. It will require creative thinking, innovative implementation, and vigilance to reach our rather aggressive goals in the years ahead. This Strategic Plan lays out for our internal and external partners the challenges and opportunities ahead (see “Strengths, Weaknesses, Opportunities, and Threats”), what we intend to do about them (see “Strategies and Thrusts”), and how and when we intend to accomplish them (see “Implementation and Timeframes”).

By the end of this first decade of the 21st century, the Technology Transfer Office will be recognized as the best. Join us in this important effort as we help university researchers and inventors reach their creative and financial potential while helping business innovators in the private sector build flourishing companies that provide jobs and make available valuable technologies in the years ahead. It is an ambitious effort but we know it can be done!



### University of Colorado Technology Transfer Philosophy

CU’s Technology Transfer Office exists to increase the competitiveness of the university. Competitiveness is enhanced by spurring entrepreneurship and innovation in research and technology development, producing technology-savvy graduates and recruiting and retaining the best faculty in the nation.



**University technology transfer begins with an idea and is successful when the resulting research enters the marketplace as a service or product.**

## CU PRESIDENT ELIZABETH “BETSY” HOFFMAN

“A University Without Walls” is an integral part of CU 2010, CU’s vision for the 21st century. Overall, CU 2010 is a bold systemwide agenda intended to break down walls separating disciplines, colleges, and campuses, and to map the future of the University of Colorado for the first decade of the 21st century. To be successful, it will take the collaborative efforts of researchers, faculty, and staff on all four campuses.

The walls must also come down between the university and the communities that support it. Through its recently revamped Technology Transfer Office, CU is poised to take bold new steps toward further integration among education, innovation, and technology. With renewed



enthusiasm and impressive expertise among new staff members, the research efforts of the University of Colorado will be able to keep up with the rapid pace of progress and change defining our world in the 21st century. As a leader in this effort, CU will meet its goal of being one of the top public universities in the nation and the world.

A handwritten signature in cursive that reads "Elizabeth Hoffman".



*President Elizabeth “Betsy” Hoffman*



*Dr. Jack Burns*

## A MESSAGE FROM JACK BURNS

*Vice President for Academic Affairs and Research*

The University of Colorado has an opportunity to be one of the national leaders in public education and research. We can be one of the truly great, top-10 universities in the country; it is happening as we speak. People are going to be looking to CU as a model for a university of the 21st century. You can feel that something truly unique is happening here.

The wonderful entrepreneurial environment in Colorado is conducive to breaking down

existing walls and creating partnerships between the university and the state’s businesses and entrepreneurial communities. We are striving to be a model for entrepreneurship; our revamped technology transfer operation is an opportunity for collaboration that will allow the faculty’s entrepreneurial spirit to flourish.

A handwritten signature in cursive that reads "Jack Burns".

## INTRODUCTION

The University of Colorado, under the direction of President Elizabeth “Betsy” Hoffman, is embarking on a transformative process to map the university’s future over the first decade of the 21st century. Vision 2010, as this process is called, will include actions and evaluative measures to achieve national recognition and campus appropriate honors. One of the goals is to create “A University Without Walls,” which includes breaking down barriers for interaction between and among campuses, and developing new partnerships involving students, faculty, staff, alumni, the state of Colorado, Colorado businesses and others committed to advancing and sharing knowledge.

One element of “A University Without Walls” is to enhance the process by which the university transforms the intellectual property resulting from its research enterprise into new products and processes. The transformation from laboratory results to commercial value is called “technology transfer.” This is a multidimensional process—identifying, securing, protecting, and licensing intellectual property are necessary elements, but insufficient in and of themselves. A final key element of the technology transfer equation is the human component—i.e., researchers from university laboratories working with business counterparts to convey the acquired know-how embodied in the discovery process.

This document is intended to serve as an educational tool for parties interested in CU technology transfer and a decision-making guide for the CU Technology Transfer Office (TTO). Indeed, this strategic plan lays out a comprehensive framework for the future of technology transfer at CU. The intended audiences are individuals within the four types of interrelated groups with which the office interacts:

- Internal Partners—faculty, staff, and student inventors
- External Partners—existing and potential licensee companies
- Technology Intermediaries—individuals in organizations that share common interests with the university’s technology transfer objectives
- Stakeholders—high-level decision makers who influence policy and resource decisions impacting TTO and its environment

### The Technology Transfer Process

Technology transfer is a key part of the research process for scientific and technical disciplines. For scientific and technical research to be of use to society, the research process does not stop with completion of a study, publication of a paper, or graduation of students. This is the point where technology transfer steps in to continue the process by identifying, protecting, packaging, and licensing to business intellectual property and know-how to further develop and commercialize university technology.

### Dr. David N. Allen, Assistant Vice President for Technology Transfer

Preceding his move to CU, from 1997 to 2002, Dr. David Allen was assistant vice president for technology partnerships at Ohio State University in Columbus. At Ohio State he was responsible for technology licensing, industrial contracts, and coordination of these offices with a business incubator, a CEO-led technology council, a research park, a proof of concept investment entity, a venture capital fund, and a biotechnology support organization. From 1991 to 1996, Allen was assistant vice president for technology and economic development at Ohio University in Athens where he headed the Innovation Center (a business incubator) and the technology transfer office. At OU he was also director of the Edison Biotechnology Institute and was involved in the creation of a venture capital fund. From 1981 to 1991, he was a professor at Pennsylvania State University in State College, teaching public policy for the first five years then teaching entrepreneurship in business administration for the next five years. While at Penn State, Allen also worked as a consultant for a seed venture capital firm.



*Dr. David Allen*

## TECHNOLOGY TRANSFER AT CU

In 2000, CU ranked fourth among public institutions receiving federal research funds (\$300 million). The sheer volume of research conducted at CU demands creation of a best practices Technology Transfer Office (TTO) to commercialize promising inventions resulting from research. As a result, the regents and the president of the University of Colorado have made technology transfer a high priority. New funds, new people, and a new organizational structure have been put in place to tap the creative and entrepreneurial spirit that resides within the faculty, staff, and students.

Technology transfer is a unified, system-level operation under the supervision of the vice president for academic affairs and research (VPAAR). In January 2002, Dr. Jack Burns assumed the duties of CU's VPAAR. Dr. Burns was previously vice provost for research at the University of Missouri-Columbia where he was instrumental in creating its technology transfer operation.

Technology transfer is administratively managed by the assistant vice president for technology transfer with offices at the two major research campuses, Boulder and the Health Sciences Center, with additional services at the Denver and Colorado Springs campuses. In February 2002, Dr. David N. Allen was named CU's first assistant vice president for technology transfer.

The system office primarily provides administrative support—intellectual property (IP) administration, compliance, and financial management—and oversight to the campus offices. The four campus offices are responsible for receiving invention disclosures. The Boulder and Health Sciences staffs primarily work with faculty and students on invention disclosures, IP protection, and commercialization. Typically, commercialization involves licensing new technology to existing companies; however, in some cases, based on the breadth of the technology and the interests of the inventors, start-up business are the most appropriate licensees. To facilitate the start-up process, TTO has created a business development arm that works with inventors, entrepreneurs in start-up companies, and the business community to maximize new company success.

In the case of start-ups that license CU technology, the university typically receives an ownership stake in the company. University License Equity Holdings Inc., previously known as the University Technology Corporation, holds and manages the ownership interest secured by the university as a consideration for the license. Upon liquidation of the ownership interest, University License Equity Holdings Inc. transfers the assets to the university and the proceeds are distributed to various parties according to the university royalty distribution formula.

### Characteristics of Intellectual Property Created at Universities

- Discovery seldom occurs as a single event, it takes years of research and experimentation.
- Inventions seldom occur within the context of a well defined problem; rather it is typical for faculty to develop technology “solutions” independent of market-defined needs or problems.
- Most university IP is considered “raw technology,” it is incomplete, unrefined, and years from being formulated into products or services ready for commercial markets.
- Faculty inventors optimize their research for peers and funding sources, which is typically different than commercial drivers.
- As in research where a small fraction of faculty are responsible for most funded projects, in technology licensing a small fraction of faculty are responsible for marketable inventions.

## SUCCESS STORIES — *Individuals*

Following are some of the groundbreaking discoveries made at CU over the last few decades. Today they represent some of the most significant foundation technologies in molecular biology, leading the field in disease diagnosis and drug development.

**Robert Allen, CU-Health Sciences Center professor of hematology**, made discoveries in the early 1980s related to metabolism of vitamin B<sub>12</sub>. The discoveries, which found applications in diagnostic laboratories and in vitamin products, have been widely licensed for a variety of uses.

**Marvin Caruthers, CU-Boulder professor of chemistry and biochemistry**, in 1982 discovered a process for solid phase DNA synthesis. This served as the foundation for development of automated gene synthesizers, opening the way to chromosome mapping and providing the link between DNA sequencing and polymerase chain reaction (PCR).

**Thomas Cech, CU-Boulder professor of chemistry**, in the late 1980s discovered that RNA could behave like an enzyme. His ribozyme discoveries were licensed to RPI, now in Boulder, which today employs 135 people. Another of Dr. Cech's significant contributions occurred in 1998 in collaboration with Geron Corporation of California and graduate student Toru Nakamura: the discovery of the

human gene for the active component of telomerase, a factor in the uncontrolled growth of cells. The discovery has implications for cancer diagnosis and treatment, and for the study of aging.

**Larry Gold, CU-Boulder professor of biology**, developed a method for generating an immensely diverse pool of DNA or RNA molecules, from which may be identified reagents for research purposes and drug development. The discovery, made in 1990, resulted in the formation of NeXagen and NeXstar Pharmaceuticals, leading to patents and products under development by Archemix, Eyetech, SomaLogic and other biotechnology companies.

## BENCHMARKING CU TECHNOLOGY TRANSFER PERFORMANCE

In strategic planning it is common to compare performance against benchmark peers in order to gain a realistic picture of what is being evaluated, in this case, the University of Colorado and its technology transfer operation. To focus on true peer universities, TTO selected top public universities with a medical center based on 2000 federal research expenditures (top University of California universities were not included because UC does not report licensing statistics except as a total of all campuses). The peer comparison group is Arizona, Illinois, Michigan, Minnesota, Penn State, North Carolina, Washington, and Wisconsin. Among these universities, CU is ranked third in federal research support. As a group, the eight peer universities averaged 6 percent federal research growth during 1997-2000; CU averaged 12 percent growth during this period.

Technology transfer activities were compared between CU and each of the eight peer institutions. Among the nine public universities, federally sponsored research ranged from a high of \$389 million awarded at the University of Washington to a low of \$187 million awarded at the University of Arizona. To account for this variation, TTO normalized relevant technology transfer variables by \$10 million in research expenditures. The table at right summarizes the findings. Complete data is available up to 2000.

### CU-Peer University Comparison

(all figures per \$10 million federal sponsored research)

	Colorado (2000)	CU Four-Year Trend	8 Peers (2000)	8 Peers Four-Year Trend
Professional Staff	.2	Steady Decline	.5	Gradual, Slight Increase
Invention Disclosures	3.1	Steady Decline	7.1	No Growth
Patents Awarded	1.0	Steady Decline	1.8	Gradual, Slight Increase
Licenses Granted	.6	Gradual, Slight Decline	2.8	Gradual, Slight Increase
License Income	\$74,000*	Steady Decline	\$424,000	Steady Increase

\* This figure is estimated to be at least double, but because of prior licensing arrangements, not all CU licensing revenue is reported through the system administration.

The results are starkly obvious: CU needs to deploy the level of resources similar to peer universities, and CU is underperforming in technology transfer relative to peers. Not only that, the gap has been widening at an alarming rate and CU has the potential to

significantly improve its technology transfer performance relative to its peers. Although the gap between CU and peers is wide, evidence from other universities indicates new levels of achievement are clearly possible.

## SUCCESS STORIES — Companies

Under the research sponsorship of a Boulder start-up company, a drug (IL-1RA) now marketed as Kineret originated in the lab of CU-Health Sciences Center professor and former chief of rheumatology William Arend. Dr. Arend discovered a protein that stops the inflammation and destruction associated with autoimmune disorders. Amgen Inc., the world's largest independent biotechnology company, acquired rights to Kineret and now has its second-largest research facility in Longmont, Colorado. Recently, Amgen announced FDA approval of Kineret to treat rheumatoid arthritis.

Companies created from CU research activities include:

**CDM Optics**, a Boulder-based start-up developing technology that improves the performance of digital imaging systems, using patented "depth-of-field" technologies from CU labs.

**Dharmacon**, a research licensee directed by CU researchers Marvin Caruthers and Steven Scaringe that markets products and customized RNA-synthesis services to research laboratories.

**Myogen**, a Colorado-based biopharmaceutical company dedicated to discovering, developing, and commercializing drugs for the treatment of heart failure and related cardiovascular complications.

**Phiar Corporation**, a Boulder company founded by Garret Moddel, a CU-Boulder professor of electrical engineering. Phiar is developing an innovative new class of ultra-high speed components for optical communications.

# STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

## Strengths

- Competitive faculty producing diverse, high-quality research
- Excellent students and relevant entrepreneurial instructional programs
- Committed senior leadership
- Loyal alumni and influential friends
- Emerging collaborative opportunities in technology-rich areas
- High IP latency—an embedded base of untapped IP

## Weaknesses

- Skeptical faculty who have pursued their own solutions
- A lack of general understanding about intellectual property
- Few positive role models
- Unclear system of rewards for faculty participation in technology development (particularly promotion and tenure)
- Few royalty-producing properties
- Minimal financial resources for speculative patenting
- Lack of technology transfer relationships with local federal research laboratories

## Opportunities

- Continually increasing federal research funding, particularly from the National Institutes of Health (NIH)
- Fitzsimons Bioscience Park and creation of a critical mass in the biotechnology sector
- Business incubators: CTEK in Boulder, Colorado Springs Technology Incubator, Bard Center for Entrepreneurship Development in Denver, and Bioscience Park at Fitzsimons
- Technology and entrepreneur-intensive regional business environment
- Supportive business community: rich networking activities involving venture capitalists and companies that are adaptors of innovative technology
- Continual attraction and retention of top scholars who have commercial interests
- Increased collaboration on technology transfer with federal research laboratories

## Threats

- Continued attempts by the federal government to limit the ability of universities to take advantage of opportunities to transfer government-supported research results to the private business sector, as allowed under the Bayh Dole Act.
- Increasing national attention directed to “conflict of interest” and compliance issues

## Retention and Recruitment of Top Faculty

Historically, top science and technology scholars had to choose between a career in academics or industry. Those who chose academia over industry did so because of a desire to make a difference in students’ lives and a perceived freedom to impact their profession, mainly through creation of new knowledge. Today, top scholars are less likely to face the previous either/or situation because universities now afford the opportunity for science and technology researchers to be involved in both commercial and academic environments. Similarly, the notion of impact has been broadened to include the effect of a university-invented commercial product or service on society. If the University of Colorado is to attract and retain today’s top scholars, it must provide a technology transfer environment at least equal, and preferably superior, to that of its peers.

## What Faculty Want from Technology Transfer

- An alternative way to impact society beyond instruction and publication
- Minimal intrusion into direction of basic research
- A competitive advantage to attract the best students and research support
- Prestige conferred by working with top firms
- Recognition of success from peers and community
- Sources of revenue not typically available to support their research

## Business Incubators

One of CU’s unique strengths relative to technology transfer is a business incubator associated with each of its four campuses. These incubators provide affordable and flexible space, access to business services, and a formidable business network of advisors, mentors, and contacts. The Technology Transfer Office intends to further tap into incubator resources to assist local, growing, sustainable technology businesses that have missions in common with the university, creating a winning situation for all concerned.

Bard Center for Entrepreneurship Development (Denver), [www.cudenver.edu/bard](http://www.cudenver.edu/bard)

Bioscience Park, Fitzsimons Redevelopment Authority (Aurora), [www.colobio.com](http://www.colobio.com)

Colorado Springs Technology Incubator

CTEK, Colorado Technology Incubator (Boulder), [www.ctek.biz](http://www.ctek.biz)

## STRATEGIC THRUSTS

### 1—Amplify the Inventor Base to Increase the Number of Quality Invention Disclosures

The licensing process begins with the inventions that result from academic research. It is important to bring inventive activity to the attention of those who could profit from commercialization: the inventor, the university, and the business community. To succeed in this area, CU must dramatically increase the quantity and quality of its potential IP base. Much of this starter material currently exists in the faculty research community but lies hidden from both the university at large and the technological community. The job of the Technology Transfer Office (TTO) is to bring to light the research and inventions that present the greatest potential; it will do so by the following means:

- Researchers and inventors at CU must believe that TTO will respond in a timely manner. To facilitate their trust, TTO will implement standards for timely response to inventors and mechanisms for returning inventions back to the inventors.
- In cooperation with TTO, the academic leadership needs to play an active role in this process in order to increase the flow of invention disclosures. Therefore, TTO staff will have frequent interaction with the chancellors of each campus, vice chancellors for research, key deans, and department heads to identify

areas where IP may be embryonic or latent.

- In order to recognize inventors for their indispensable contributions, TTO will institute an annual inventors recognition awards program and publicize inventors' accomplishments through a variety of media.
- Because many inventions need funding during the initial proof of concept/validation stage, TTO will work with a variety of groups to create and externally fund a technology commercialization entity that will provide much-needed financial support at this crucial stage of the process.
- In order to participate in the attraction of entrepreneurial faculty, TTO will develop a special presentation for faculty recruiting.

### 2—Instill Effective Practices to Identify Licensees and Ensure Efficient Transactions

Although university technology licensing activities have comparable processes in both the academic and corporate worlds, university licensing activities have unique features. As a profession, university licensing is little more than two decades old, an infant in comparison to the realms of business and technology. Over those years, however, a few driving operational forces have evolved that CU's TTO needs to understand and build upon.

They are:

- Most inventors produce solid licensing leads. Therefore, licensing officers at CU will provide increased, intensive inventor interaction and timely feedback and response. TTO staff will initiate discussions about disclosures by telephone; meet with the inventor to discuss the technology and the inventor's commercial interests, commitment, and industry contacts; and follow up with frequent contact by phone and/or e-mail as negotiations evolve.
- To identify the appropriate licensee, TTO's marketing efforts will make effective use of the inventor's contacts, web-based marketing tools, and local networks. Market research must proceed from identifying broad contextual objectives to finding key contacts in prospective licensee companies. Three types of research are important: market assessment, technical feasibility appraisal, and IP review. Today, most of this can be accomplished via the Internet, but TTO will also work with existing networks established by Colorado's business incubators and industry associations.
- The process of securing a license from CU must be clear and concise. Given the recent staff turnover, organizational changes, and new operating procedures, a road map outlining steps and contacts will be created to help guide companies that want to license CU technology.

## IMPLEMENTATION AND TIMEFRAMES

### 1 Amplify the Inventor Base to Increase the Number of Quality Invention Disclosures

1. Establish four-month invention disclosure response time and invention return parameters in patent policy. *Timeframe:* November 2002 completion of revised IP policy
2. Establish quarterly meetings with key academic leadership. *Timeframe:* immediately
3. Plan and execute inventors' recognition and awards ceremony. *Timeframe:* November 2002
4. Build support for an external commercialization entity. *Timeframe:* fall 2002 completion of business plan

5. Participate in faculty recruiting to convey importance of technology transfer at CU. *Timeframe:* immediately

6. Stretch goals for 2002-03: 20 percent increase in invention disclosures, 15 percent increase in patent applications, grant licenses to six start-up companies

### 2 Instill Effective Practices to Identify Licensees and Ensure Efficient Transactions

1. Increase interaction with inventors. *Timeframe:* immediately
2. Engage local business networks in invention assessment. *Timeframe:* immediately
3. Create a road map for licensing procedures. *Timeframe:* initial implementation with new web site with enhancement during fall 2002
4. Stretch goals for 2002-03: 45 percent increase in license transactions, 25 percent increase in royalty revenue, 25 percent increase in ratio of legal fee reimbursements to legal expenditures

## STRATEGIC THRUSTS *continued*

### 3—Establish Policies and Procedures Congruent with Academic Values and Business Practices

Technology transfer is an activity that spans the boundaries of two different but complementary worlds—academia and business. Presented with inherently different purposes and cultures, CU's TTO must be sure that its services are clear and responsive to the needs of all parties.

- During the 2002-03 academic year, TTO will work within the university's shared governance procedures to revise the existing IP policy. The revised policy will preserve traditional academic values and ensure TTO's financial viability while meeting the needs of the business community.
- In the revision of the royalty distribution element of CU's IP policy, it is essential to ensure a financial return to the inventor, i.e., an economic incentive, and provide discretionary funding for research directed by the inventor.
- TTO's budget comes from a number of sources; over time, the operation needs to substantially grow its own revenue base to achieve a level of self-sustainability, though sustainability may not occur for many years. Critical to this goal is an investment mentality. The revision of the

royalty distribution element of the IP policy must, therefore, ensure a financial return for TTO.

- The revised policy will establish guidelines for faculty ownership and participation in start-up companies that license faculty-created IP. The existing Conflict of Interest Policy was promulgated prior to the university's significant support for start-up companies and expanding federal regulations. TTO will work with the academic community to create conflict management plans that balance entrepreneurial engagement with academic integrity and regulatory compliance.
- To facilitate cooperation and communication among all parties, TTO will create a permanent technology transfer advisory board composed of university leaders and accomplished executives from the entrepreneurial and technology business communities. The first steps toward this objective have already been taken with the establishment of internal and external advisory boards for this Strategic Plan.

### 4—Promote Service Excellence by Empowering a Professional TTO Staff

Historically, CU's TTO has been understaffed and has not had adequate tools to do the required work effectively. Empowerment in any field derives from the clear authority to act and the tools necessary to act in a decisive manner. TTO's staff will be empowered to implement the necessary changes in the months and years to come.

- Members of TTO's staff have worked diligently to revise standard licensing agreements; these agreements will be continually updated and improved to reflect technology transfer trends nationwide. The new standard agreements are available at [www.cu.edu/techtransfer](http://www.cu.edu/techtransfer).
- Most licensing officers are not lawyers, although they are required to operate in an intensely legalistic environment. On occasion, technology transfer negotiations may depart from the standard agreement; prompt legal assistance, advice, and review by an attorney who specializes in such matters are essential to the process. Therefore, an attorney hired by the Office of the General Counsel will operate within the Technology Transfer Office and be accessible to all TTO staff.
- Funds will be set aside for U.S. patent applications and prosecution and, to a more limited extent, international filings and patent

#### Criteria used in Assessing the Commercial Potential of University Intellectual Property

- Motivation of the inventor to participate
- Patentability and potential patent claims
- Technical feasibility (will it work?)
- Marketability and profitability of products or services
- Development trajectory (time, money, and fit to existing systems)
- Potential competition
- Continuous innovation (fitting into an existing process or system) or discontinuous innovation (a new technology that will disrupt existing technologies and can be the basis of a new company)

## IMPLEMENTATION AND TIMEFRAMES *continued*

### 3 Establish Policies and Procedures Congruent with Academic Values and Business Practices

1. Enact revised IP policy. *Timeframe:* by November 2002
2. Enact royalty distribution element in IP policy. *Timeframe:* by December 2002
3. Ensure resources for growing technology transfer operation. *Timeframe:* annually until no longer needed
4. Establish clearer guidelines for faculty ownership and participation in start-up companies. *Timeframe:* by October 2002
5. Create and engage a standing external advisory board. *Timeframe:* initial board in place, permanent board by September 2002

### 4 Promote Service Excellence by Empowering a Professional TTO Staff

1. Improve standard licensing agreements. *Timeframe:* immediately
2. Hire a transactions oriented attorney. *Timeframe:* by August 2002
3. Allocate funds for speculative patent filings. *Timeframe:* 2002-03 budget
4. Conduct annual customer satisfaction survey. *Timeframe:* baseline in July 2002, second survey in March 2003
5. Complete searches for licensing directors at CU-Boulder and CU-Health Sciences Center. *Timeframe:* by September 15, 2002
6. Establish performance measurement for all staff. *Timeframe:* July 2002
7. Establish staff bonus program for performance that exceeds expectations. *Timeframe:* July 2002

maintenance. Speculative patent funding is essential because most “raw” university IP takes years to mature. In addition, patents need to be geographically expansive and patent claims broadly construed in order to interest licensees.

- To continuously improve customer satisfaction, TTO will assess its performance by annually surveying its audiences and emphasizing continuous improvement among the staff. CU’s licensing operation will convey confidence and efficacy to customers, partners, and stakeholders. This is important in an environment where compromise is the only way to create winning outcomes.
- The office will be staffed with well-trained professionals who are broadly engaged with the various technology transfer audiences. Enhanced staffing will ensure less turnover and quality service that balances specialization with cross-functional training.
- To overcome a legacy of fragmentation and to ensure responsiveness to its clientele, TTO will establish clear lines of decision-making authority. Staff members will agree to clear, mutually determined work objectives and be held accountable for performance measured against those objectives.

## 5—Enhanced Communication and Continued Education of All Audiences

Communication is key if CU is to be successful in the technology transfer arena. Successfully communicated technology transfer messages will also increase the understanding and receptivity of all its audiences. To ensure that its audiences keep current with technology transfer trends and evolving TTO policies, the office will create educational programs on specific topics aimed at specific audiences.

- To provide university inventors with greater IP familiarity, TTO will begin a series of seminars, forums, and workshops primarily taught by recognized venture capitalists, IP attorneys, and business development specialists.
- To create a sense of community between faculty and business people, venture capitalists and company executives will be asked to sponsor small groups of targeted faculty for lunches and receptions to discuss common research and commercial interests.

- To enhance efficiency and communication, TTO has begun to implement an interactive database designed exclusively for U.S. university technology transfer operations. This system will provide TTO staff with real-time access to patent and licensing data in order to prepare custom reports. The system will be extended to provide secure web site access to all patent and licensing documents on a need-to-know basis.
- Establishing brand recognition for CU’s TTO will provide a clear identity in this time of transition and beyond. TTO has engaged the offices of Publications and Creative Services and Web Communications to establish a brand identity, build a new web site, and help produce collateral materials to convey the messages of change, professionalism, and engagement in TTO’s marketing and communication programs.

## 5 Enhanced Communication and Continued Education of All Audiences

1. Conduct series of seminars, forums, and workshops for both large and small audiences. *Timeframe:* average of three per month starting September 2002
2. Organize small group lunches and events with targeted faculty, VCs, and CEOs. *Timeframe:* average of one per month starting September 2002
3. Deploy new database. *Timeframe:* immediately
4. Create web-based database for inventor and administrative use. *Timeframe:* by July 2003
5. Deploy new TTO web site. *Timeframe:* June 2002 and continually add content
6. Create marketing collateral materials. *Timeframe:* September 2002

## Guiding Principles for CU’s Technology Transfer Office

- Build confidence among inventors to increase invention disclosures
- Protect university interests while being approachable and open to industry
- Ensure public accountability while operating in an entrepreneurial fashion
- Obtain for CU appropriate economic and social returns on IP
- Support faculty in securing research grants and contracts related to the IP they create
- Bring students into the technology transfer process and support the instructional mission
- Contribute to the economic development of the state of Colorado

## FINANCIAL MODEL

An essential aspect of any strategic plan is to determine the resources that can be deployed to meet the goals of operation.

Two financial objectives for CU's Technology Transfer Office are paramount:

- secure the financial resources necessary to scale up the operation and perform at a pace that exceeds our peers' growth so that, over time, TTO will exceed its peers' performance, and
- achieve self-sustainability and, over time, as revenue exceeds costs, direct funds back into the research enterprise.

Given the status of CU's technology transfer operation and the considerable head start achieved by peer universities, a long-term investment commitment is key. To determine how much money must be invested for how long, a financial model has been built that estimates future revenues and expenditures based on CU's known performance, expected future revenues, and growth estimates derived from peer experiences.

The two greatest costs are personnel and intellectual property protection. Today, the competitive pressures to hire top technology transfer personnel are intense and many qualified staff leave academia for the higher salaries offered by private industry. If CU is to solve the lack of continuity due to high turnover, it must offer competitive compensation packages. Similarly, CU has not directed

sufficient resources toward speculative patent positions, given that it often takes many years for IP to mature into a marketable asset. For instance, development timeframes of five years are common for university IP and human therapeutical drugs can take double that time. TTO's operational budget for 2002-03 is \$2.5 million: \$1.55 million for personnel, \$480,000 for legal expenses, and the same for operational support. The personnel budget will support 16 full-time employees by the beginning of 2003, up from 11 in 2002.

Technology transfer revenues come from three sources. First, TTO receives 25 percent of its net income from licensing transactions, primarily royalties, license fees, and equity liquidations. Previous royalty arrangements, however, redirected approximately half of that income toward research activities, necessitating support from two other university sources—the office of the president and the offices of the chancellors at Boulder and the Health Sciences Center. Currently, no state or CU Foundation funds support technology transfer.

In order for CU's technology transfer operation to grow and achieve competitive performance levels, financial support from the offices of the president and the Boulder and HSC chancellors must continue through FY 2007 at which time the operation will be self-sustaining and no longer need outside support.

CU's technology transfer efforts must grow and improve if TTO is to achieve its vision of being the recognized leader in technology transfer by 2010. In addition, the university must continue its commitment of support and invest in the operation. This conservative financial model is based on a steady, "singles and doubles" pace of growth, which would lead to an estimated cash break-even point in five years. However, as seen in other universities, the most important variable to turning around a university technology transfer operation is an occasional "home run" royalty-producing technology and the prudent reinvestment of returns from such a home run into the operation, thereby taking it to a significantly higher level of performance.

### Broad-based Support Across the University Community

- **President**—reiterate and communicate the role of technology transfer in Vision 2010
- **VPAAR**—support the entrepreneurial culture, reduce bureaucratic impediments, and facilitate collaborative strategies
- **Budget and Finance**—provide long-term support for TTO as it moves toward self-sustainability
- **Legal Affairs**—maintain a balance between the technology transfer risks and the rewards to the university
- **Campus Chancellors**—continue to provide financial and leadership support
- **Colleges and Departments**—create positive incentive and reward environments for technology transfer
- **Faculty**—support colleagues who are generating intellectual property and participating in technology transfer
- **CU Foundation**—gain commitment of friends and alumni
- **Communications**—integrate technology transfer into overall systemwide marketing and communication activities

"This plan articulates a thoughtful and compelling strategy for the University of Colorado to capitalize on its vast intellectual and research prowess. It deserves the enthusiastic support of every member of the university and business communities."

**Tom Washing, Managing Partner  
Sequel Partners**

## MEASURABLE OUTCOMES

**M** easurement of the effectiveness of technology transfer must include multiple performance indicators; no one figure should predominate the performance measurement. Although results are easy to measure, the numbers have meaning only in the context of the larger system, and successful relationships built on quality service lead to inventions disclosed by researchers and inquiries from business. The system starts with initial contacts such as Materials Transfer Agreements (MTAs), Confidential Disclosure Agreements (CDAs), and Intellectual Property clauses in sponsored research contracts. The ensuing patent process proceeds through invention disclosure, assessment, patent application, prosecution, and maintenance. During this time, agreements such as options and licenses are executed, which may lead to company start-ups, eventually leading to measurable financial outcomes of induced sponsored research, royalties, and equity return. Progress will be charted on all the above measures.

Enhanced relationships and measurable technology transfer successes ultimately improve the university's competitiveness and TTO's reputation amongst members of both the campus and business communities. In such a heightened environment, it is easier to attract and retain key resources such as faculty. This may be a hard objective to measure, but it is a priority among departmental and college academic administrators.

Among stakeholders in the business community and the state, creating and retaining core technologies and new companies that create jobs and wealth is a priority. Given the strength of Colorado's technology community and its interest in seeing the University of Colorado succeed at technology transfer, this becomes a focal point for motivating change. At present CU has 116 active licenses; nearly one third of the companies licensing CU technology are based in Colorado. The target for Colorado-based licensees is 50 percent, to be achieved in five years.

Creating this plan is a first step and accounts for a small portion of the university's efforts to overhaul its technology transfer enterprise; execution on the part of TTO and others is the key to overall success. Execution requires tireless attention to detail, a discipline of staying focused on the plan, revising the plan to meet changing realities, a passion for success, and moving at the speed of business. Successful implementation of the guiding principles laid out in this plan will also take patience. Although there are many leaders in the field throughout the country, weaving technology transfer into academic culture has yet to be fully accomplished at any major university. Although the University of Colorado is behind the curve now, with TTO's renewed energy and sustained commitment CU can become the best among all public universities by 2010. This is our vision and we will relentlessly pursue it.

"If what ultimately separates a successful organization from an also-ran is the quality of the people surrounding it, then it must be said that CU's new technology transfer initiative is off to a very promising start. I see quality throughout those who are involved, from the administrative staff to the faculty to community business leaders. All seem fully committed to seeing CU's technology transfer program among the nation's elite."

**David J. Cook, Special Counsel  
Faegre & Benson LLP**

"This Strategic Plan presents an aggressive approach to revitalizing the university's handling of its intellectual property. It will take a major shift in the culture of the institution to fulfill this plan. The vision set forth in the plan, if achieved, makes the effort needed to bring about this change well worthwhile."

**R.C. "Merc" Mercure, Jr.,  
Chairman and CEO  
CDM Optics, Inc.**

## CONCLUSION

The University of Colorado has distinguished itself as a world-class education and research institution. However, its technology transfer ambitions are largely unfulfilled, a situation that CU is positioned to change. This Strategic Plan provides a road map for how technology transfer will be woven into the university's future.

The process by which CU will build a quality technology transfer operation is quite straightforward—leverage key strengths and emerging opportunities to overcome existing weaknesses. The university's key strengths are well known: quality research, a diverse and growing Colorado technology sector, relevant entrepreneurship instructional programs, loyal alumni and influential friends, and an administration committed to achieving successful technology transfer. Opportunities, such as the growth of federal research funding, attraction and retention of commercialization-interested scholars, a regional biotechnology sector building critical mass, and a business community looking for ways to be supportive, will be integrated with existing strengths to build long-term momentum for change.



This straightforward notion of leveraging strengths and opportunities must be translated into disciplined action. A few examples illustrate the need for collaboration, diligence, and focus:

- TTO staff will work with leading practitioners from intellectual property, technology adoption, and venture capital sectors who will present technology transfer information to small groups of faculty research leaders in specific technology areas.
- TTO staff will work with faculty who will create teams of business, law, science, and engineering students to conduct commercial feasibility assessments and build business plans derived from CU's intellectual property assets.
- Senior campus academic leaders will receive periodic information about the intellectual property and licensing performance of their units, and work with TTO staff to create specific plans to enhance unit performance.

- TTO staff will work with writers and marketing professionals in the numerous communications outlets across the university to convey stories of technology transfer change and success.

These examples demonstrate three important facets of CU's revamped technology transfer operation. First, technology transfer involves many more people than just an inventor and a licensing officer. By engaging more people in the process, technology transfer will integrate more fully into the university and business communities. Second, technology transfer is a continuation of the research process and an important way researchers create impact beyond the completion of a grant or publication of a paper. Third, innovation in technology transfer means introducing new ways of doing things in organizational, professional, communications, and financial realms. The Technology Transfer Office is committed to new ways of thinking and doing that will produce the kind of intellectual property and licensing operation that the University of Colorado deserves.

### Colorado Bioscience Park

This 160-acre research center is being developed at the former Fitzsimons Army Medical Center in Aurora, Colorado. With 2 million square feet of space for an eventual workforce of 4,000, this university-affiliated biomedical and biotechnology research facility presents tremendous opportunities for CU in this century. The park will provide space for faculty researchers and inventors and Colorado businesses that commercialize the resulting products and know-how. Bioscience Park at Fitzsimons represents a true integration of research, innovation, and commerce—technology transfer on a grand scale! See [www.colobio.com](http://www.colobio.com) for more information.



## Vision Statement

By 2010 the University of Colorado Technology Transfer Office will be recognized as the best among public universities.

## Mission Statement

The mission of the CU Technology Transfer Office is to aggressively pursue, protect, package, and license to business the intellectual property generated from the research enterprise and to serve faculty, staff, and students seeking to create such intellectual property.

### CONTACT US:

For CU-Boulder inventors  
Ken Porter  
ken.porter@colorado.edu  
phone: 303-735-1109  
fax : 303-492-2128

For CU-Colorado Springs inventors  
Michele Land  
michele.land@uchsc.edu  
phone: 719-262-3903  
fax: 719-262-3077

For CU-Denver inventors  
Dorothy Yates  
dyates@carbon.cudenver.edu  
phone: 303-556-4060  
fax: 303-556-3377

For CU-Health Sciences Center inventors  
Jill Jones  
jill.jones@uchsc.edu  
phone: 303-724-0221  
fax: 303-724-0816

For information about licensing to  
start-up companies  
David Drake  
david.drake@cu.edu  
phone: 303-735-1085

For general information and CU System office  
David Allen  
david.allen@cu.edu  
phone: 303-735-3711  
fax: 303-735-3831

General address for correspondence:  
CU System Technology Transfer Office  
4001 Discovery Drive, Suite 390  
588 SYS  
Boulder, CO 80309-0588

Web site: [www.cu.edu/techtransfer](http://www.cu.edu/techtransfer)

