University of Colorado

Boulder | Colorado Springs | Denver | Anschutz Medical Campus

TECHNOLOGY TRANSFER

Annual Report

TECH TRANSFER 2011/12

The CU Technology Transfer Office provides patent and other commercialization support to researchers at CU's four campuses, and serves as a liaison for industry partners interested in commercializing CU technologies.

www.cu.edu/techtransfer

About CU

Founded in Boulder in 1876, the University of Colorado has developed into a premier teaching and research university with four campuses: the University of Colorado at Boulder, the University of Colorado Colorado Springs, the University of Colorado Denver and the University of Colorado Anschutz Medical Campus. In fall 2012, over 57,500 students were enrolled across the four campuses.

University of Colorado research faculty secured over $815M in sponsored research funding in fiscal year 2011-12. The only higher research total in CU history came in fiscal year 2009-10, which included one-time federal stimulus dollars allocated through the American Recovery and Reinvestment Act (ARRA). CU Denver and Anschutz Medical Campus researchers received over $429M in sponsored research funding. CU-Boulder researchers received more than $380M in sponsored research funding, and UCCS researchers received more than $5M.

FY2011-12 TTO Performance at a Glance

Invention Disclosures (see chart at right)	226
New Patent Filings	116
Follow-on Patent Filings	199
U.S. Patents Granted	40
Total Options & Licenses	48
Exclusive Options & Licenses	33
Non-exclusive Licenses	15
Start-up Companies Formed from CU IP (see inside)	10
Service Agreements Executed (see chart at right)	823
Revenue (in millions)	32.8
Ratio of legal fee reimbursements to legal expenditures	66%

Notes: The criteria used for TTO's performance metrics conform to the standards used by the Association of University Technology Managers (see www.autm.net). Service measures include interinstitutional and IP management agreements, materials transfer, confidential disclosure agreements and software evaluation.

TTO Portfolio Snapshot as of July 1, 2012

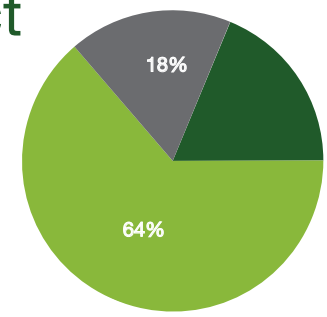
- 343 U.S. Patents in Force
- 329 U.S. Patent Applications in Prosecution
- 163 Exclusive Licenses in Force
- 172 Non-exclusive Licenses in Force
- 98 Companies created based on CU IP still in business
- 68 Companies in which University License Equity Holdings, Inc. (ULEHI) holds equity

2012-13 Budget

$2,432,362	Salaries, Benefits, Students
320,000	General Operating Expenses
266,482	System Overhead
184,000	Building Rentals
1,405,000	Patent Costs, Legal Expenses
100,000	Innovation Center of the Rockies
40,000	ULEHI Management Service Fee
350,000	Proof of Concept Programs
$5,097,844	**Total Expense**

Colorado Impact

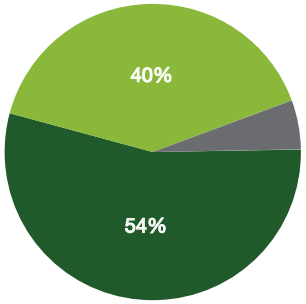
As of July 1, 2012, CU had 171 non-exclusive technology licenses and 167 exclusive technology licenses in good standing (see charts at right). Typically, non-exclusive licenses are designed to exploit intellectual property such as software and biomaterials that have broadly applicable value as development tools or in service applications. Exclusive licensing, by contrast, often best advances the value of CU's most foundational and transformative technologies; exclusive licenses provide for investment and development into new products, creating in many cases new companies and jobs. The charts at right demonstrate that, while there is a global market for technology coming from the University of Colorado, the greater part of CU's most high-impact technologies are being further developed and deployed under exclusive licenses by firms located in Colorado.



Non-exclusive Licenses

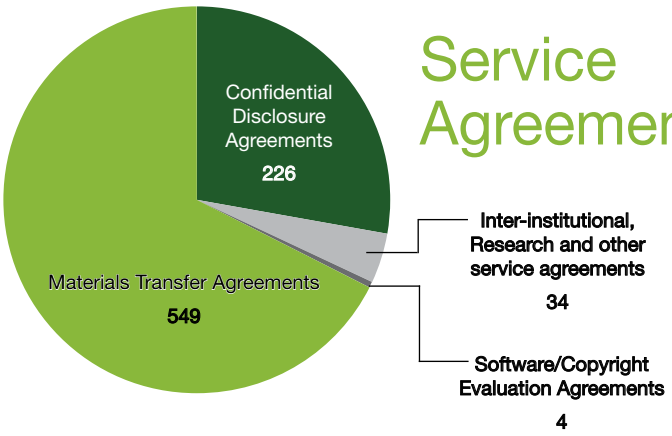
- Colorado Firms
- Other U.S. Firms
- International Firms

Exclusive Licenses

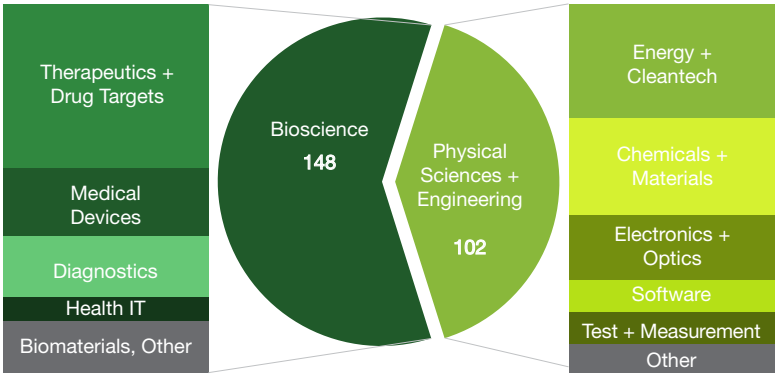


CU technologies have also been the basis of 114 new companies since 1994; of the 91 companies that are still operational, 85 have key operations in Colorado (although the headquarters may be located out-of-state). These Colorado-based firms have attracted more than $1.3B in follow-on financing, including venture capital, federal grants and other types of funding.

Service Agreements



New Inventions



Summary: Fiscal Year 2011-12

Technology transfer continues as a viable component of the University of Colorado research enterprise, and an important contributor to Colorado's innovation economy. Over the past year, national macroeconomic conditions remain "in irons," although Colorado economic conditions fare somewhat better. Against this backdrop, CU technology transfer continued its long-term run of economic self-sufficiency and value-based involvement with faculty inventors and the business community.

Fiscal year 2011-12 was significant in that the Technology Transfer Office (TTO) completed a $30M license royalty monetization, recapitalizing the TTO reserve fund. The previous few years were financially difficult for TTO, and (as has been chronicled in recent annual reports) TTO was required to draw from its reserve fund to balance its account. Fiscal year 2012-13 starts off with TTO in a position that will enable it to fund its operations well into the future.

Other than the financial opportunity mentioned above, FY2011-12 was "steady as she goes" – no other aspects of technology transfer spiked relative to recent years. In essence, CU TTO is maintaining a stable pace of identifying potentially viable inventions, securing these inventions through the patent process, helping (in select cases) to mature the inventions, identifying commercial entities to further develop and productize the inventions, and building a licensing pipeline that creates social, clinical and economic impact.

This process starts with research ideas, experiments and data commenced by CU's world-class faculty in conjunction with talented students and technical staff. These research endeavors are primarily supported by U.S. federal agencies that fund highly competitive proposals meant to push the envelope of understanding in science, medicine and engineering. As these ideas take shape through a painstaking research process, notions evolve about what these ideas might enable in the form of products, services and solutions that address problems and opportunities affecting society. From this "raw ore" of discoveries, the refinement process begins, with securing the ideas as intellectual property (primarily patents) and forming relationships with entities that can develop and commercialize these patents. The costs of development and commercialization are typically hundreds of times more expensive that the funding which supported the original discoveries; licensing the discovery-oriented intellectual property provides an opportunity for these commercial partners to see a return on their development and commercialization investments. Given the extensive CU TTO portfolio of IP and licenses, this process ultimately involves hundreds of people across a wide range of complex duties and responsibilities; over any given year, the number of decision points in this process is staggering. This report chronicles many of the actions, projects, companies, technologies and people that constitute CU technology transfer activity over the past fiscal year.

On a personal note, this is the last CU TTO annual report that comes under my purview: by the time this report is released, I will be at the University of Arizona. I have spent slightly more than ten years at CU and it has been a delight to serve the University. The challenges have been inspiring, the rewards have been profound and the personal engagements benevolent. I feel privileged to have had this experience and wish great impact and fortune to the hundreds of people who have played a role in making CU technology transfer a successful enterprise. I leave behind a superb set of people at TTO who will continue to serve faculty inventors and the technology business community with graceful aplomb and value-driven relationships.

Warm regards,

David N. Allen, former Associate Vice President, Technology Transfer

CU Proof-of-Concept Grants

Proof-of-Concept programs provide grant funding to CU inventors to move promising CU technologies closer to key commercial milestones. In the past year, POC grants were awarded under the Bioscience Discovery and Evaluation Grant (BDEG) program, funded by the State of Colorado Office of Economic Development and International Trade (OEDIT) matched by funding from the CU campuses and TTO. TTO also provided matching funds for one Market Assessment Program grant made by CU Cleantech (part of the Deming Center for Entrepreneurship at the Leeds School of Business) and one independent POC grant.

Christopher Bowman
Department of Chemical & Biological Engineering, CU-Boulder, for an inexpensive synthetic DNA alternative material with optimal stability.

Robert Garcea
Department of Molecular, Cellular & Developmental Biology, CU-Boulder, for a low-cost manufacturing process of a novel HPV vaccine for use in developing regions.

Richard Johnson
Department of Medicine (Renal Diseases & Hypertension), CU Anschutz, for a new drug to prevent acute kidney injury.

Malik Kahook
Department of Ophthalmology, CU Anschutz, for a non-invasive surgical device for treatment of glaucoma.

Uday Kompella
Department of Pharmaceutical Sciences, CU Anschutz, for a new drug for wet, age-related macular degeneration (AMD).

Leslie Leinwand
Department of Molecular, Cellular & Developmental Biology, CU-Boulder, for a drug to induce beneficial cardiac adaptation, for prevention and treatment of cardiovascular disease.

Richard Noble
Department of Chemical & Biological Engineering, CU-Boulder, for lyotrophic liquid crystal (LLC) nano-filtration membranes for water desalination, wastewater treatment and industrial separations processes.

Zhiyong (Jason) Ren
Department of Civil Engineering, CU Denver, for a highly efficient, scalable microbial fuel cell.

Andrew Thorburn
Department of Pharmacology, CU Anschutz, for validation and development of a new biomarker test to guide cancer treatment.

David Wagner
Department of Medicine (Pulmonary Sciences & Critical Care), CU Anschutz, for a drug to prevent or reverse hyper-glycemia in type 1 diabetes.

Xiao-Jing Wang
Department of Pathology, CU Anschutz, for a potent, anti-inflammatory human protein to treat oral mucositis.

Hang (Hubert) Yin
Department of Chemistry & Biochemistry, CU-Boulder, for more sensitive and accurate, minimally invasive diagnosis of metastatic cancers.

Excellence in Tech Transfer

The CU Technology Transfer Office presented its annual awards on January 17, 2012 to faculty and companies developing technologies ranging from novel treatments for chronic pain, eye disease and metabolic syndrome to new materials with applications in clean energy, and techniques for more efficient biofuels and solar power. Awards were given to:

CU Denver|Anschutz

Jeffrey L. Olson Inventor of the Year
Richard J. Johnson New Inventor of the Year

CU-Boulder

Linda R. Watkins Inventor of the Year
Wei Zhang New Inventor of the Year

UCCS

Anatoliy O. Pinchuk New Inventor of the Year

Phobos Energy Physical Sciences Company of the Year
OPX Biotechnologies Bioscience Company of the Year

S. Gail Eckhardt
Business Advisor of the Year

Michael R. Bristow
Serial University Startup Entrepreneur Award

Sustainability of Companies Created Based on CU Technology

In the last 18 years, 124 companies have been formed based on CU IP. 26 are known to be non-operational. Of the 98 companies known to be operating,

- 88 have operations in Colorado (although the headquarters may be located out-of-state)
- 19 have received CU Technology Transfer Office Proof of Concept investments
- 19 have received matching grants under the Colorado Office of Economic Development & International Trade's Bioscience Discovery & Evaluation Grant program
- 7 have "gone public," becoming publicly traded companies (either through an IPO or via a reverse merger)
- 17 have been acquired by public companies (including five from the above seven that have gone public)

Companies Created Based on CU Technology FY2011-12

Advanced Conductor Technologies High-performance superconducting cables for power transmission and energy storage

ASTRA LiTe LIDAR device for determining remotely and accurately determining depths of semi-transparent media

Double Helix 3-D super-resolution imaging technology for microscopy applications

Gogy Interactive e-learning software

MetaCytoLytics Compounds for treating drug resistant tumors based on disrupting the metabolism of cancer cells

MobileAssay Smartphone-based, app-enabled mobile real-time diagnostic technology

ClarVista Medical Novel method for the in situ attachment of a secondary intraocular lens onto an implanted lens

Shape Ophthalmics Shape memory polymer punctal plug and micro shunt devices for ophthalmic applications

VG Energy "Metabolic disruption" technology for increasing the oil content of algae for biofuels production

Xeris Pharma Ready-to-use Glucagon rescue pen for diabetic seizures

Major Financing Events for CU Licensees

Grants/Gifts	$515,000
Federal Grants	8,774,637
Seed/Bridge	500,000
Series A	7,500,000
Series B	246,000,000
Series C/D/E/F/other	73,290,000
State funding	6,364,160
SBIR/STTR	15,783,456
Acquisition/Merger	10,000,000
Total Financing	**$368,727,253**

Based on over 40 transactions, start-up licensees of CU technologies secured nearly $369M of financing in FY2011-12. This figure not only represents a large increase over FY2010-11's adjusted total of ~$193M, but also exceeds the previous high-water mark of $233M in financings in FY2008-09. This year's transactions were dominated by the $10M acquisition of Eyetech (makers of CU's drug Macugen) by Valeant Pharma in 2012, and significant investments in OPX Biotechnologies, miRagen Therapeutics, BiOptix, TerraSpark, Sundrop Fuels, and others.

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