



University of Colorado

TECHNOLOGY TRANSFER OFFICE

Annual Report

TECH

TRANSFER

2009/10

The CU Technology Transfer Office pursues, protects, packages, and licenses to business the intellectual property generated from research at CU. The TTO provides assistance to faculty, staff, and students, as well as to businesses looking to license or invest in CU technology. For more information about technology transfer at CU, visit www.cu.edu/techtransfer.

About the University of Colorado

Founded in Boulder in 1876, the University of Colorado has evolved into a network of four unique campuses: the University of Colorado at Boulder, the University of Colorado Denver, the University of Colorado Anschutz Medical Campus and the University of Colorado at Colorado Springs. The campuses had a combined fall 2010 enrollment of nearly 57,500.

University of Colorado faculty researchers secured more than \$847M in sponsored research funding in fiscal year 2009-10, remaining highly competitive among peers despite the economic downturn. This dwarfs the record \$711M CU researchers drew in fiscal year 2008-09, but one-time federal stimulus dollars allocated through the American Recovery and Reinvestment Act (ARRA) boosted the 2009-10 total. CU-Boulder researchers received more than \$454M in sponsored research funding. UC Denver and Anschutz Medical Campus researchers received almost \$385M in combined sponsored research funding, and CU-Colorado Springs researchers received more than \$8M in sponsored research funding.

FY 2009/10 TTO Performance at a Glance

Invention Disclosures	—	232
U.S. Patent Applications Filed	—	254
U.S. Patents Granted	—	27
Total Options & Licenses	—	57
Exclusive Options & Licenses	—	40
Non-exclusive Licenses	—	17
Start-up Companies Formed from CU IP	—	9
Service Agreements Executed (see note)	—	691
Revenue (in millions)	—	2.8
IP-induced Sponsored Research (in millions)	—	10.6
Ratio of legal fee reimbursements to legal expenditures	—	53%

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 material transfer agreements, confidential disclosure, software evaluation, and interinstitutional and IP agreements.

TTO Portfolio Snapshot as of July 1, 2010

U.S. Patents in Force	—	307
U.S. Patent Applications in Prosecution	—	317
Exclusive Licenses in Force	—	158
Non-exclusive Licenses in Force	—	203
Companies created based on CU IP, still in business	—	83
Companies in which University License Equity Holdings, Inc. (ULEHI) currently holds equity	—	54

CU Technology Transfer Office FY 10/11 Budget

Salaries, Benefits, Students	—	\$2,171,874
General Operating Expenses	—	200,000
System & Boulder Overhead	—	229,836
Building Rentals	—	172,724
Patent Costs, Legal Expenses	—	1,176,000
Boulder Innovation Center	—	50,000
ULEHI Management Fee	—	60,000
Proof of concept programs	—	205,000
Treasury loan repayment & interest	—	335,866
Total Expense		\$4,601,300

Summary: Fiscal Year 2009/10

Technology Transfer at the University of Colorado is thriving. The robust CU research enterprise (\$847M in system-wide awards for FY 2009-10) continues to produce high quality inventions. Commercial interest in the inventions is strong, even though the innovation economy has suffered for the past few years. However, all is not rosy; financings, liquidations and licensing revenue are appreciably down from previous years.

By the middle of 2010 the U.S. stock market had rebounded, but distress continued in the innovation economy, much like what has been happening in housing and employment. Venture capital financing has significantly decreased relative to a few years back, and of the financings undertaken, many were to companies that had already received capital. Typically, follow-on funding occurred at the same share price. U.S. governmental grant and contract programs, advanced by the American Recovery and Reinvestment Act of 2009, have helped finance the development of many CU technologies, but the “stimulus funding” has by now almost completely worked its way through the economy.

Against this backdrop, CU TTO (Technology Transfer Office) is proud of the FY 2009-10 achievements illustrated in these key performance indicators as compared to the average (in parentheses) over the previous six years:

- Continued growth of the CU IP pipeline, with 232 invention disclosures (212), 254 U.S. patent applications (129) and 27 issued U.S. patents (25);
- Continued growth of the CU license portfolio, with 40 exclusive license and options (38); and
- Nine start-up companies based on CU research receiving exclusive licenses (10).

In addition to these performance indicators, the State of Colorado Bioscience Discovery Evaluation Grant program (aka HB08-1001 or the Bioscience Proof of Concept program) continued into the third year with 10 research groups receiving a total of \$1.6M. The CU-Boulder Renewable and Sustainable Energy Institute (RASEI) supported two POC grants, for a total of 12 grant awards. TTO's relationships with vital entrepreneurial support organizations such as the Boulder Innovation Center (BIC) and the Fitzsimons BioBusiness Partners (FBBP) remained strong and productive. TTO contributed to key technology industry associations such as the Colorado Bioscience Association (CBSA, which at its annual awards event recognized TTO as a 2010 Business Partner of the Year) and the Colorado Cleantech Industry Association (CCIA). TTO continues to build productive relationships with entities across the University as diverse as the Deming Center for Entrepreneurship, the Colorado Clinical and Translational Science Institute and the University of Colorado Foundation.

As stated earlier, TTO's financial performance was below expectations. For the past few years TTO has reported gradually decreasing revenue due to patent expirations, but the prolonged recession has worsened the revenue picture. For example, no equity liquidations over \$100K occurred last year, compared to an average of \$1.5M just a few years back. The resulting low total revenue of \$2.8M has led TTO to balance its operations by tapping reserves in its long-term investment account, leaving a beginning FY 2010-11 account balance of \$4.6M.

CU TTO is poised for revenue recovery based on ownership in 55 companies, a maturing licensing portfolio and a few therapeutic compounds in Phase II and Phase III clinical trials. With help from an improving innovation economy, TTO will be able to continue its past six years of financial self-sufficiency and rebuild many programs, such as our Proof of Concept grants, that have been significantly curtailed over the past few years. A few forces are operating to support optimism that the university technology transfer sector will rebound:

- Technology company profits and competition for new products will fuel an appetite for acquisitions;
- Pharmaceutical companies are looking to universities for opportunities to augment their dwindling pipelines;
- The State of Colorado, Colorado universities and Colorado-based federal research laboratories are building commercialization collaborations which include CU as a key partner, such as the Colorado Institute for Drug, Diagnostic and Device development (CID4) and Colorado Center for Drug Discovery (C2D2); and
- CU's commercialization reputation is attracting potential partners at national and international levels.

Until such time as these forces in the economy begin to impact CU revenue growth and allow expanded programmatic activity, TTO is committed to provide high quality service to its customers and value to its stakeholders. This commitment and mission is solid.

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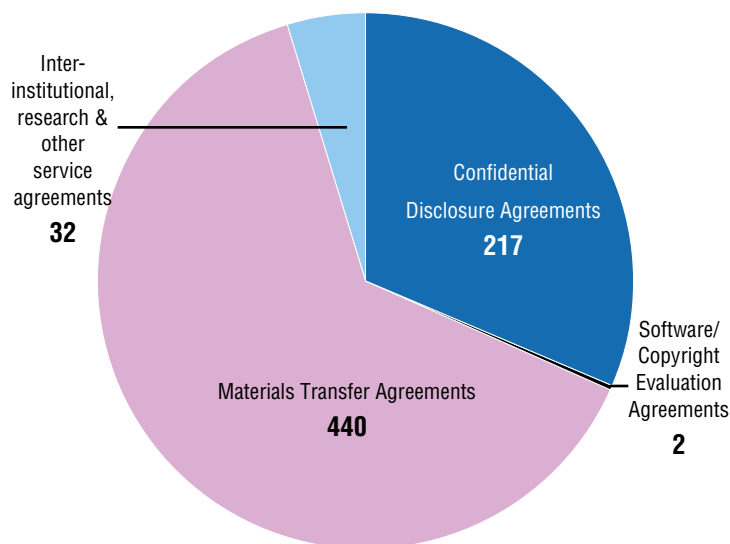
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CU's Contributions to Technology Development and Commercialization in the State of Colorado

As of July 1, 2010 CU had 203 nonexclusive technology licenses in good standing and 158 exclusive technology licenses in good standing. Of the 203 nonexclusive licenses (NELs), 35 (16%) were granted to International firms, 138 (70%) were granted to U.S. firms, and 30 (14%) were granted to Colorado firms. Most of these NELs are software (primarily for speech recognition and river basin modeling) and biomaterials (cell lines, vectors, plasmids, etc). Although NELs are good, they do not convey unitary assets that can be further developed, serve as investment opportunities, and ultimately become the basis for new product lines and in some cases new companies that employ significant numbers of people. However, exclusive licenses **do** convey unitary assets that can achieve these outcomes. With regard to exclusive licenses, CU had 158 in good standing as of July 1, 2010. Of these, 85 (54%) were to Colorado firms, 64 (40%) to the rest of the U.S., and 9 (6%) to International firms. This short analysis points to a national and global marketplace for CU IP, but more significantly, most of the strongest and broadest IP assets coming from the University of Colorado are further developed and deployed by firms located in Colorado.

Service Agreements



Types of Inventions by Major Category

BIOSCIENCE		PHYSICAL SCIENCES/ENGINEERING	
Therapeutics & Drug Targets	63	Energy & Cleantech	19
Medical Devices	29	Electronics & Optics	11
Diagnostics	21	Chemicals and Materials	21
Software-Health IT	7	Mechanical Devices	3
Research Tools	10	Software-General	15
Processes, Drug Delivery Other	17	Micro & Nanotech	5
		Other	11
Total Number	147	Total Number	85

TTO Proof of Concept (POC) Grants and Market Assessment Program (MAP) 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 primarily in bioscience. These grants are awarded by the Technology Transfer Office and are funded in conjunction with partner organizations such as the State of Colorado Office of Economic Development and International Trade (OEDIT), Colorado Initiative in Molecular Biotechnology (CIMB) and campus contributions. The State of Colorado Bioscience Discovery and Evaluation Grants (BDEG) funding can range from \$75,000 to \$200,000, and the technologies are selected based on a competitive selection process.

In addition to the State BEDG program, last fiscal year TTO worked with CU-Boulder's Renewable and Sustainable Energy Institute (RASEI), to conduct RAESI's Market Assessment Program (MAP). This program aims to conduct feasibility studies and prepare commercial roadmaps; projects deemed viable through the MAP process are eligible for RASEI's POC grant program.

The BDEG and MAP awards from FY 2009-10 are identified below:

State of Colorado Bioscience Discovery and Evaluation Grants (BDEG)

Kristi Anseth and Christopher Bowman, Department of Chemical & Biological Engineering, CU-Boulder, for an advanced wound care treatment for burns and skin injuries.

Stephanie Bryant, Department of Chemical & Biological Engineering, CU-Boulder, for bioengineered cartilage for craniofacial reconstruction.

Sean Colgan, Division of Gastroenterology, UC Denver, for a diagnostic screen to distinguish Irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD).

Thomas Flaig, Division of Medical Oncology, UC Denver, for a novel treatment for bladder cancer.

Ryan Gill, Department of Chemical & Biological Engineering, CU-Boulder, for molecular biorefining for sustainable gasoline.

Malik Kahook, Department of Ophthalmology, UC Denver, for an implanted device to reduce intraocular pressure and treat glaucoma.

Xuedong Liu, Department of Chemistry and Biochemistry, CU-Boulder, for new drug targets leading to novel cancer therapeutics.

Jeffrey Olson, Department of Ophthalmology, UC Denver, for the "Zip Clip" microsurgical suturing device.

David Ross, Department of Pharmaceutical Sciences, UC Denver, for novel cancer therapeutics with reduced toxicity.

Ed Wagner, Division of Pulmonary Sciences and Critical Care Medicine, UC Denver, for prevention and reversal of autoimmune diseases.

Renewable and Sustainable Energy Institute (RASEI) Market Assessment Program (MAP) Grants:

Scott Bunch, Department of Mechanical Engineering, CU-Boulder, for graphene membranes with applications in gas separation.

Charles D. Corbin, Department of Civil Engineering, CU-Boulder, for a low-cost, modular, building-integrated photovoltaic-thermal collector.

Jean Koster, Department of Aerospace Engineering, CU-Boulder, for a new hybrid aircraft propulsion technology.

Se-hee Lee, Department of Mechanical Engineering, CU-Boulder, for solid electrolyte materials to be used in battery applications.

Richard Noble and John Falconer, Department of Chemical and Biological Engineering, CU-Boulder, for an improved dye-sensitized solar cell for higher energy conversion efficiency.

Cortlandt Pierpont, Department of Chemistry and Biochemistry, CU-Boulder, for an electrochemical cell for water splitting to produce hydrogen.

Alan Weimer, Department of Chemical and Biological Engineering, CU-Boulder, for new materials with applications in synthetic fuels.

New Business Development Based on CU Intellectual Property

In the last 17 years, 103 companies have been formed based on CU IP. 20 are known to be non-operational. Of the 83 companies known to be operating,

- 79 have operations in Colorado (although the headquarters may be located out-of-state)
- 23 have received CU Technology Transfer Office (TTO) Proof of Concept investments (including one 2009-10 grant funded by RASEI, see below).
- 7 have “gone public,” becoming publicly traded companies (either through an IPO or via a reverse merger)
- 12 have been acquired by public companies (including five from the above seven that have gone public)

Companies Created Based on CU IP, FY 2009-10

Xalud Therapeutics	—	Naturally anti-inflammatory cell-signaling proteins for treatment of chronic pain
Physical Activity Innovations	—	Shoe-based device for movement sensing, biomechanical analysis and behavior modification
AmideBio	—	Novel manufacturing method for peptide and protein research reagents and clinical products
FlashBack Technologies	—	Fast, non-invasive detection of acute blood loss volume and prediction of cardiovascular collapse in emergency situations
Syberenety	—	Social networking tool and smartphone app to support recovering addicts
Western States	—	Novel anti-inflammatory therapeutics for autoimmune diseases
Biopharmaceuticals		
ICVrx	—	Drug reformulations and delivery systems targeting disorders of the central nervous system
Tigon EnerTec	—	Modular, energy efficient, and eco-friendly hybrid propulsion systems
PeptiVir	—	Peptide-based universal influenza vaccine

Recognizing Excellence in Technology Transfer

The CU Technology Transfer Office presented its annual awards on January 20, 2010 to faculty and companies working on the development of treatments for infectious diseases, programs to help recovering trauma victims, human eyecare, human medical devices and children’s literacy.

Awards were given to:

- Robert T. Batey, Inventor of the Year, UCB
- Robert S. Hodges, Inventor of the Year, UCD
- Mark E. Rentschler, New Inventor of the Year, UCB
- Malik Y. Kahook, New Inventor of the Year, UCD
- Charles C. Benight, New Inventor of the Year, UCCS
- GlobeImmune, Inc., Bioscience Company of the Year
- Mentor InterActive, Inc., Physical Sciences Company of the Year
- Fitzsimons BioBusiness Partners (Michael Artinger, Director), Business Advisor of the Year

Major Financing Events for CU Licensees

Based on more than 50 separate financial transactions, FY 2009-10 saw approximately \$96M of financing for companies created based on CU IP. Ongoing distress in the innovation economy and venture capital community played a significant role in this decreased level of funding (compared to over \$178M in total funding to CU licensees in 2008-09). FY2009-10 transactions were led by financings of GlobeImmune, MedShape Solutions and Taligen Therapeutics.

Type of Funding FY 09-10 Amount

Federal Grant	—	\$10,683,426
Seed/Bridge	—	\$6,424,997
Series A	—	\$4,175,000
Series B	—	\$40,000,000
Series C, D, E, F	—	\$19,900,000
State funding	—	\$1,938,050
RASEI POC ₁ funding	—	\$50,000
SBIR/STTR	—	\$6,171,641
Acquisition/Merger	—	\$6,800,000
Total Financing		\$96,143,114

To view available CU technologies or to sign up for our monthly e-newsletter, please visit www.cu.edu/techtransfer