

2014-2015

• COLORADO

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DRAWING People AND DATA TOGETHER

6 MOBILE HEALTH IN COLORADO:
Where "Big Data" Sparks Big Ideas

16 COLORADO LIFE
SCIENCE ASSETS

33 COLORADO BY
THE NUMBERS

48 COLORADO BIOSCIENCE
INDUSTRY DIRECTORY

Naresh Mandava M.D., and Malik Kahook M.D.,
of Found in Translation: Rocky Mountain
Lions Institute... pg. 26

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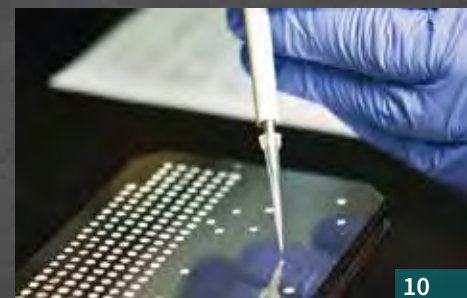
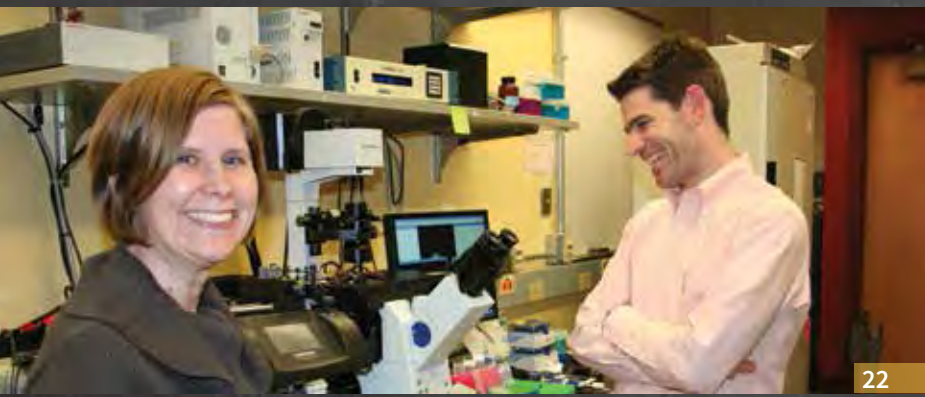
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2014-2015 Drawing People & Data Together to Benefit Human Health



CONTENTS

- 06 Mobile Health in Colorado: Where “Big Data” Sparks Big Ideas
- 10 Biodesix Harnesses Machine Learning and Analytics to Tackle Multivariate Diagnostics
- 14 Bioscience in Colorado Continues to Shine with U.S. Senator Michael Bennet
- 16 Colorado Life Science Assets: A Sophisticated Repertoire of Clinical-Stage Therapeutic, Device and Diagnostic Products
- 22 Webb-Waring Biomedical Research Program
- 26 Found in Translation: Rocky Mountain Lions Eye Institute Translational Research Programs Focus on Innovative Treatment of Eye Diseases
- 30 Connecting the Dots: Tech Transfer Offices Connect Research and Marketplace to Stimulate the State's Economy
- 33 Colorado by the Numbers: Financing and Acquisitions
- 36 Grant Programs: Innovation Engines
- 48 Colorado Bioscience Industry Directory



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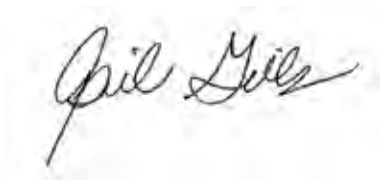
Welcome to the Colorado BioScience Association's eleventh anniversary edition of *Bioscience Colorado*. This publication is a key resource for companies, investors and economic developers, and has become THE go-to source for our industry. With a total audience of over 8,000, including online impressions, this publication is one of the industry's greatest voices—locally, nationally and internationally.

In this issue we are looking at the intersection of people and data, and how it benefits human health. Big Data is now playing a critical role within the bioscience industry—from the personal devices on our wrists monitoring our bodies, to electronic medical records housing our health histories, data is valuable.

Colorado's bioscience assets are also valuable. Device, diagnostic and therapeutic products created here have a significant economic impact—27,000 in total workforce—translating to over \$10 billion in the State's economy each year. In addition, over 60 acquisitions, financings and grants, totaling over \$4 billion, were reported within the 2013 calendar year, further developing the industry's ecosystem.

Companies in Colorado have created important life-saving drugs and devices. We are proud to have continually grown the industry here and are excited for what the future brings.

Bioscience in Colorado truly is driving innovation, creating jobs and improving lives!



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President and CEO
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MOBILE HEALTH IN COLORADO

Where “Big Data” Sparks Big Ideas

BY JEANNE McADARA-BERKOWITZ, PH.D.

In a laboratory within the University of Colorado Boulder’s Department of Computer Science, machine learning algorithms analyze input from a robot’s sensors and guide it smoothly through a complex obstacle course. Fifty miles away in Greeley, farmers analyze data from thousands of tiny, wireless temperature monitors residing within the reticula of their herd of dairy cows. Meanwhile, a father in Pueblo makes a midnight drive to the emergency room, too worried over his young daughter’s worsening cough and spiking fever to wait for tomorrow’s appointment with her pediatrician.

The common thread between these scenarios may not be immediately obvious, but, in fact, each plays a part in an emerging story about companies in Colorado that are applying big data and big software engineering solutions to solve big problems in human health.



Discovering clinically important relationships

Steve Moulton, M.D., is the director of pediatric trauma and burn programs at Children's Hospital Colorado, a professor of surgery at the University of Colorado School of Medicine, and also the founding chief medical officer of Flashback Technologies in Boulder. He joined the university in 2007 with experience from a previous startup, and an idea nagging at the back of his mind.

"Electronic medical records were just starting to gain traction, and I had this thought that if we could store continuous vital sign waveform data in EMRs, and then analyze them against other clinical data, we could begin to discover new, clinically important relationships. Being a surgeon, I was most interested in better methods for the detection and management of acute blood loss."

Moulton knew of an ongoing research program at the U.S. Army Institute of Surgical Research (USAISR) at Fort Sam Houston, near San Antonio, Texas, that had developed an experimental model capable of simulating acute volume loss associated with traumatic injury or rapid dehydration in humans. Overseen by Victor Convertino, PhD, tactical combat casualty care research task area program manager at the USAISR, the program sought to discover patterns in noninvasively collected vital signs data, such as those generated by pulse oximetry, that could accurately predict impending hemodynamic collapse. However, the datasets being collected were enormous, complex and impossible to analyze using conventional methods.

A call to the Department of Computer Science at CU-Boulder connected Moulton with Assistant Professor Greg Grudic, PhD, and Research Assistant Professor Jane Mulligan, Ph.D. Together, Grudic and Mulligan had studied machine learning in the context of autonomous robotic navigation for more than 20 years. Through a cooperative research and development agreement (CRADA) with the university, the USAISR was able to provide datasets from its volume-loss model for the team to analyze.

"We got the data and Greg and Jane fed it into their integrated feature extraction and machine learning algorithms," says Moulton. "The software was able to determine which features of the waveforms were important, and literally within four to six weeks the team had built initial models for continuous, beat-to-beat analysis of vital signs as they trended from normovolemia to hemodynamic collapse."

The resulting technology has led to the creation of a new physiological parameter called the compensatory reserve index (CRI). The CRI is being developed by Flashback Technologies and is now in early-stage clinical trials, funded by the US Army. If successful, the technology will provide a new tool to

solve the long-standing problem of detecting and managing acute volume loss in a wide range of clinical applications, and serve as proof-of-concept for using machine learning to solve other data intensive health questions.

Gathering body temperature data to predict disease

The inspiration that led to the founding of Prima-Temp, also located in Boulder, seems similarly serendipitous. The company's clinical founder and chief medical officer, Wade Webster, M.D., had been practicing as an emergency room physician in Kirkland, Washington, and had become interested in the potentially enormous clinical utility of collecting and analyzing continuous body temperature data.

"While poring through old textbooks and studies published many years ago, Wade was fascinated to learn that specific patterns in body temperature fluctuation can be predictive of certain infections and diseases well before other symptoms manifest," says Lauren Costantini, Ph.D., the company's CEO. "These practices went by the wayside with the advent of biomarkers and more advanced molecular diagnostics, but he thought they could have enormous utility if we had an easy, reliable way to capture and analyze continuous temperature data."

Costantini says that the problem Webster had to solve was how to get at those data when the current standard of care for monitoring patient temperature in the hospital is

I had this thought that if we could store continuous vital sign waveform data in EMRs, and then analyze them against other clinical data, we could begin to discover new, clinically important relationships."

to measure it with a thermometer about once per nursing shift. "It's antiquated, really, and Wade realized that there is so much more we could do in early detection of infectious disease, hospital-acquired infections, and other diagnostic areas if we had more robust temperature data to work with."



A new physiological parameter called the compensatory reserve index (CRI) is currently being developed by Flashback Technologies and is now in early-stage clinical trials, funded by the U.S. Army.



It so happens that Webster was raised in Greeley, and was involved in development of a wireless internal temperature sensing technology used by the dairy industry there and developed by Boulder-based Phase IV Engineering. Webster and Phase IV adapted the sensor and wireless transmission technology for human use, and Prima-Temp was born.

“Essentially Phase IV asked me, ‘what do you need it to look like?’ and together we began collaborating on several application-dependent form factors that now make up our product pipeline,” says Costantini. While Prima-Temp continues to pursue its long-term goal of developing external sensors for continuous, in-hospital temperature monitoring, the first product they anticipate bringing to market is the Ovu-Ring, which is directed at the reproductive health and assisted fertility market. This device continually measures a woman’s core body temperature to help identify fertility cycles and predict optimal timing for conception.

Connecting people with health information: There’s an app for that

iTriage of Denver, which was founded five years ago and is now a part of Aetna, was also started by emergency room physicians. They had practiced for 20 years and collectively seen tens of thousands of patients, and were determined to find a solution to a problem they saw over and over—patients who understood very little about medical information and about how to efficiently access the healthcare system.

“When they get sick or hurt, patients want to know what they have, how serious it is, and where they should go to get the appropriate level of help,” says Peter Hudson, M.D., a co-founder and the CEO of iTriage. “Our goal was to develop a mobile app to help people navigate and connect with the U.S. healthcare system.”

They have been successful with that focus, developing a mobile app that helps users learn about health problems, compare symptoms, decide whether urgent care is needed,

iTriage is a mobile app developed to help people navigate and connect with the U.S. healthcare system. It can be accessed through any mobile device and help users learn about health problems, decide whether urgent care is needed and schedule appointments.



Peter Hudson, M.D.
Co-founder and CEO of iTriage

find doctors, make appointments and track health information. Hudson says iTriage’s free app has been downloaded more than 11 million times, and hosted more than 50 million sessions last year. The company claims 20 percent of the U.S. hospital market as customers, and their acquisition by Aetna in 2011 has given them access to a huge amount of network- and member-specific data to analyze, and turn into integrated products for the mutual benefit of patients and member providers.

“Right now a lot of hospital systems are trying to integrate with physicians to create a strong network of allied providers, but they have a hard time reaching customers,” says Hudson. “iTriage gives providers tools to help them connect with and educate people on the mobile devices they use every day.”

The relatively sudden rise of the mobile health industry and companies like Flashback, Prima-Temp, and iTriage owes itself to developments in computing science that didn’t exist a decade ago. For example, as Hudson points out, “The miniaturization of powerful computing technology into portable, smart mobile devices with a slick user interface, their rapid and widespread adoption, and mechanisms for easy distribution of software apps were necessary precursors to the development of mobile health applications.”

Moulton adds that recent advances in analytics have been critical to mobile health. “A lot of this has been dependent on having these machine learning technologies and feature-extraction algorithms similar to those that Google and Facebook are now using to scour huge consumer behavior datasets,” he says. “The difference is, we’re using them to scour datasets representing literally terabytes of individual-specific health data.”

Costantini notes an overall trend favoring greater collaboration between medical and engineering sciences. “It used to be rare, but now you can get experts in engineering, information technology, analytics and medicine together in a room, and each outlines the problems they’re trying to solve. The others speak up to say ‘I can do that,’ and before you know it, you have a mobile health product in development.”

If it's any indication of how significant the potential in this space is, computing industry giants Google and Apple have clearly taken notice, with recent acquisitions of intellectual property and talent, and meetings with the FDA, that send strong signals about their intent to get into the sector.

The hurdles, on the other hand, are not trivial. Although the FDA recently issued much-welcomed guidance for the mobile health industry, the regulation of healthcare products that combine software and devices is still evolving, and pioneers in this space face the risks of forging an untested regulatory path. Defining target markets and educating audiences about the uses and limits of the technology also present tough new challenges.

Moreover, while the potential benefits of mobile health are enormous, it remains to be seen whether mobile health and the associated trend known as the "quantified self" will prove to be a temporary trend with its principal value in consumer entertainment, or a durable movement toward improving clinical outcomes.

"Some will take it seriously as a way to achieve an optimal level of health and performance," says Moulton. "Some will routinely check their personal data to stay loosely within norms, and there will be others who couldn't care less."

"The real question," adds Hudson, "is whether people are self-quantifying when they're already fit and healthy just to confirm what they already know, or are people who really need this health knowledge using it to get better? Will those people use it long-term to achieve the health results they're hoping for?"

“It remains to be seen whether mobile health and the associated trend known as the ‘quantified self’ will prove to be a temporary trend with its principal value in consumer entertainment, or a durable movement toward improving clinical outcomes.”

Nevertheless, for pioneers in the mobile health space, the opportunities enabled by this convergence of data analytics and medicine are too exciting to pass up. Says Costantini, "We as humans are constantly radiating data, and finally we're in a position to capture those data and do something with them. The quantifiable self will lead to the optimized self." 🌐

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BIODESIX

Harnesses Machine Learning
and Analytics to Tackle

MULTI DIA

BY JEANNE McADARA-BERKOWITZ, PH.D.

When Ginny learned that her seemingly innocent, nagging dry cough was actually advanced non-small cell lung cancer (NSCLC), the active, otherwise-healthy 65-year-old was stunned but determined to face her difficult treatment head-on. The therapy was initially effective, but eventually the cancer began progressing again, and Ginny and her oncologist were faced with choosing the next step in treatment. While it wasn't certain which if any of the remaining options would be effective, all of them were likely to cause difficult side effects.

According to the American Cancer Society, more than 1.6 million Americans will be newly diagnosed with cancer in 2014, and that figure leaves out recurrent disease. This means that, like Ginny, millions of patients and their physicians will face the risk-benefit trade offs involved in

treatment decisions. The growing availability of companion diagnostics provides some guidance by matching patients with the therapies most likely to be effective and steering them away from treatments that are destined to be ineffective due to a patient's individual genetic makeup.

One such tool is the VeriStrat® test, developed by Boulder-based molecular diagnostics company Biodesix. Like other companion diagnostics, VeriStrat identifies the presence or absence of specific biomarkers in patients with NSCLC. VeriStrat's output helps the oncologist determine the sequence of second-line treatments, including whether the patient should receive erlotinib (Tarceva®), an epidermal growth factor receptor (EGFR) inhibitor, or instead be prescribed an alternative, single-agent chemotherapy.



INVARIATE GNOSTICS

What separates VeriStrat from other companion diagnostics on the market is that it is a multivariate test based on an underlying proteomics-based technology. Unlike tests that amplify a single nucleic acid sequence or detect the presence of a single protein, VeriStrat was developed



David Brunel
President and CEO of Biodesix

using a specialized analytics platform, ProTS, which analyzes the output of matrix-assisted, laser desorption ionization (MALDI) mass spectrometry from a small volume of blood serum or plasma. ProTS provides a set of tools for maximizing the usability and reproducibility

of individual features in the MALDI spectrum, enabling the detection of complex, clinically relevant and validated signatures from blood serum and other complex samples.

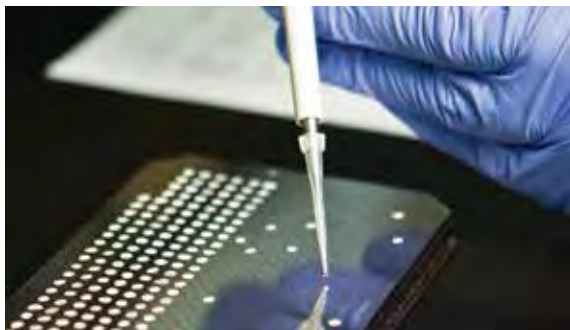
“It’s been an exciting couple of years for the field of personalized medicine,” says David Brunel, president and CEO of Biodesix. “But efforts like the 1000 Genomes project are only one part of the story; we have to move beyond the patient’s genotype toward their actual current state—the phenotype—and we can accomplish that through a series of emerging ‘proteomic’ technologies.”

“We’re moving away from an over-reliance on straightforward, single-marker targets like PSA for prostate cancer, CRP for inflammation and cardiovascular disease, or HER2 for breast cancer,” he continues.

“For many years there’s been interest in multivariate diagnostics and whether they could be used to guide the use of therapy. Now we’re finally seeing better tools for answering these clinical questions.”

Analytics and algorithms

Multivariate analysis is no simple prospect. Technologies like MALDI-mass spec, genome-wide association studies and other complex clinical analyses generate



a lot of data—enough that the development of specialized computational methods designed to deal with and analyze those data has been critical.

Biodesix has approached the diagnostics problem by drawing on the expertise of mathema-

ticians, physicists and software engineers to develop specialized analytics, capitalizing on the advancements in machine learning going on outside of diagnostics.

According to Brunel, the team at Biodesix is working to adapt these analytics to address the specific problems encountered when trying to develop validated tools for improving the practice of medicine.

“One point of difference in our field is that we may have large datasets for each patient, but generally we have very few patients in the initial study population,” says Brunel. He says this situation can potentially lead to over-fitting problems, because the analytics will always

be able to find correlations through random chance. Biodesix’s challenge is to build diagnostics that can be validated beyond the patients in the initial study and can therefore be generalized to larger populations.

“What we’ve done is to create a set of tools that help us identify useful features that are differentially expressed in patients with and without the disease we’re interested in,” says Brunel. “We then move on with another set of tools that use ‘deep-learning’ algorithms. These are similar to the algorithms that Facebook and Google use to continually extract utility from the vast troves of data they collect, from recognizing faces to reminding you that certain friends have been less attentive lately.”


Potentially useful or discriminating features that have been identified then go through an iterative refinement process with the eventual goal of creating a validated classifier for clinical prediction. Such tools could help identify patients at risk for disease, diagnose the presence of active disease, guide treatment decisions and avoid interventions that would be unnecessary or even harmful.

A new era of diagnostic medicine

“One example of this application would be a test for early ovarian cancer in women with abdominal masses,” says Brunel. “Only about three percent of such masses are ever found to be cancerous, but getting to that answer often requires multiple invasive surgeries that sometimes, in themselves, create opportunities for metastasis. It would be so much better to have a blood test to help rule out cancer before surgery is performed.”

Brunel notes that the potential applications for this approach are nearly limitless. “We’re interested in this new era of diagnostic medicine, where in some cases it will still be used strictly to guide intervention for acute disease, but its ultimate use will be to monitor health to maintain optimal wellness.”

“As the technologies for measuring genes, proteins, metabolites and the many specific variations in each of these classes of molecules improves and costs decline, we see diagnostic development becoming more of an ‘in silico’ practice,” he continues. “The exciting thing about our technology is that it is indifferent to whether the biological attributes being analyzed are proteins or genes or data from a physiological monitor, or even a combination of those. This is an evolution and a revolution that we want to be a part of.”

Using VeriStrat, Ginny’s oncologist learned that the recurrent cancer had a reasonable probability of being susceptible to treatment with erlotinib, tipping the risk-benefit equation in favor of that treatment strategy. Although the outlook for patients with advanced metastatic cancer is still difficult, the knowledge gave Ginny’s team confidence that they were not wasting precious time on an ineffective treatment. 

VeriStrat, developed by Biodesix, identifies the presence or absence of specific biomarkers in patients with NSCLC, which helps the oncologist determine the sequence of second-line treatments.

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Companion diagnostics help identify patients at risk for disease, diagnose the presence of active disease, guide treatment decisions and avoid interventions that would be unnecessary or even harmful.

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U.S. Senator Michael Bennet

Colorado is famous for many things, like our endless opportunities for outdoor recreation (including skiing in the world famous Rocky Mountains), our 300 plus days of sunshine a year and even our diversity of craft brewers.

But what certain circles don't know about is our leading reputation as a hub for innovation. Our state's world-class universities, highly educated workforce, excellent quality of life and pioneering spirit have made Colorado a mecca for inventors, entrepreneurs, innovators and start-ups.

All of this has contributed to a diverse and thriving bioscience industry that

ranges from TOLMAR, Inc., a pharmaceutical research, development and manufacturing company in Fort Collins, to Gevo, a Denver-based renewable chemicals firm that is developing next-generation biofuels. This industry encompasses more than 600 companies and employs 27,000 people, with an average salary of \$84,000.

The collaboration between private companies and public policy has played no small part in supporting this booming industry. More than a decade ago, policymakers, scholars and business leaders from throughout the state came together to develop the foundation of what is now one of the top 10 bioscience industries in the country. We helped build Denver International Airport, encouraged new companies to relocate to Colorado, and focused on developing a pro-growth climate for business.

These efforts were validated last year when the Kauffman Foundation released a report naming four Colorado cities in the top 10 nationally for high-tech startup density. Boulder took the top spot, followed by Fort Collins-Loveland (#2), Denver (#6) and Colorado Springs (#9).

The Colorado Bioscience Industry:

- » Over **600** companies
- » Employs over **27,000** people
- » Average salary of **\$84,000**

More recently, at the national level we have been advocating for common-sense measures to increase stability and opportunity for the industry. In 2012, we successfully passed the Advancing Breakthrough Therapies for Patients Act, which creates a "Breakthrough Therapy" designation for certain drugs and treatments that show dramatically positive responses early in development. This allows these medications to be expedited through the FDA approval process. This "breakthrough" designation can reduce the FDA approval process by up to 10 years, ensuring that lifesaving drugs being developed by innovative companies aren't mired in red tape in Washington D.C., and are instead getting to the patients that need them.

Last year, we wrote and passed the most comprehensive effort to establish safeguards for the drug distribution supply chain in the last quarter-century. The Drug Quality and Security Act will track all prescription drugs from the time they are manufactured to the moment they are picked up at the drugstore. No longer will consumers be able to find out more from a bar code on a gallon of milk than they do from a bar code on a bottle of prescription drugs.

This bill also improves the safety of compounded drugs in an effort to avoid tragedies like the meningitis outbreak in 2012, in which nearly 50 people died from contaminated medication made at a New England compounding facility. This bipartisan bill helps restore consumer confidence in our prescription drug industry and provides pharmaceutical companies with needed reliability as to the source of prescription drugs.



Finally, the decision to locate one of only three new satellite offices of the United States Patent and Trademark Office in Colorado will be a critical asset for future bioscience development. This will put our state's bioscience firms that much closer to the patent process they rely on to continue developing groundbreaking innovations.

Our state is about more than just the Rockies, the sunshine and the craft beer. It's also about a culture of innovation that has helped establish Colorado as a destination for new and existing bioscience companies that are generating new ideas, creating jobs and leading us into the 21st century economy. ©



Bennet tours the Colorado BioScience Association's Company of the year 2012, with Mike Duncan, CEO, TOLMAR Inc. in Fort Collins, CO.

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Colorado *Life Science* ASSETS

A Sophisticated Repertoire of Clinical-Stage Therapeutic, Device and Diagnostic Products

BY ADAM RUBENSTEIN

The Colorado bioscience ecosystem is committed to the ongoing development of new therapies, devices and diagnostics for serious diseases and medical conditions. Just as a product pipeline can signal to the street various elements about a company—such as business strategy or therapeutic focus—an aggregated view of the robust and diverse pipeline of Colorado life science assets signals a very diverse, innovative, well-financed and sophisticated repertoire of potential commercial products, representing all stages of pre-clinical and clinical development.

At its core, translational science is, in part, a numbers game. With so many different types of risk associated with the commercialization efforts of a life science product, it behooves a lab, or a company, or in our analysis, a state, to queue up as many shots-on-goal as possible, given sufficient access to power the development of such capital-intensive labors. It has been broadly documented that the probability for asset failure is high. A recent January 2014 study of clinical development success rates for investigational drugs by Hay et. al. derived an approximate 10% likelihood of FDA product approval for those candidates who can transition from the discovery/pre-clinical stage to a first in human phase I trial. Thus, the chances for market approval of a therapeutic are low.

The funnel of potential commercial product inputs begins with those assets that are nearing the clinic. In Colorado these discovery-stage candidates run the gamut of therapeutic areas. The University of Colorado (CU) has more than 150 pre-clinical aspirants that include a spectrum of technologies and approaches, from RNAi to small molecules and biologics, and beyond. Joining CU at this proof-of-concept stage are numerous companies such as Vivaldi Biosciences, which has made great clinical progress with a number of influenza vaccine constructs, and is now pursuing a clinical development program for their emerging seasonal influenza vaccine. miRagen Therapeutics has a full basket of pre-clinical assets whose common denominator



is their pursuit of miRNA (miRNA) biology approaches for the potential treatment of heart failure, peripheral arterial, neuromuscular and cardiometabolic disease, pathological fibrosis, vascular and myeloproliferative disease, just to name a few. Bolder BioTechnology has a diversified pre-clinical pipeline of proprietary, long-acting human protein biopharmaceuticals that include potential treatments for hematological and endocrine disorders, cancer and infectious disease. The company leverages their technology expertise in site-specific PEGylation and immunofusion proteins to target anemia, neutropenia, multiple sclerosis, hepatitis B and C, growth hormone deficiency and thrombocytopenia.


Diversity abounds along the Colorado Front Range biotechnology corridor, particularly in relation to first in (wo)man phase I clinical trials. N30 Pharmaceuticals has successfully begun dosing patients with their lead molecule, N9III5, a novel inhibitor of S-nitrosoglutathione reductase (GSNOR), in development for the treatment of cystic fibrosis (CF). In pre-clinical studies, N9III5 has been shown to rescue F508del-CFTR, the most commonly occurring mutation in CF. It is the first oral GSNOR inhibitor to enter clinical development, and represents an important step forward in the development of more effective treatments for this serious disease.

While having a host of more clinically mature molecules, Array Biopharma ARRY-612 has entered phase I trials—a dual inhibitor of p38 mitogen-activated protein kinase and Tie2 receptor tyrosine kinase. The ARRY-612 candidate offers a unique mechanism of action for the treatment of myelodysplastic syndromes, which are a group of diseases that affect the bone marrow and blood. Globelmmune, in collaboration with the National Cancer Institute, initiated the GI-6301 phase I clinical trial in subjects with metastatic cancers who have failed previous therapy or have no further therapeutic options. The company's targeted molecular immunogen (Tarmogen™) therapeutic vaccine platform technology activates the immune system by stimulating certain T-cells that destroy malignant cells, in contrast to traditional vaccine, which predominately stimulates antibody production. Globelmmune's Tarmogen targets the molecular profile that distinguishes a diseased cell from a normal cell, and is designed to target specific antigens that play a role in oncology indications and infectious diseases.

Ventria Bioscience lead therapeutic clinical candidate is VEN-100, a phase II recombinant human lactoferrin (rHLF) for antibiotic-associated diarrhea. Today, an affordable and high quality supply of human lactoferrin limits its use in human therapeutics. Ventria Bioscience has developed the ability to produce therapeutic quantities

“A recent January 2014 study of clinical development success rates for investigational drugs by Hay et. al. derived an approximate 10% likelihood of FDA product approval for those candidates who can transition from the discovery/pre-clinical stage to a first in human phase I trial.”

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 SCHOOL OF BIOMEDICAL ENGINEERING 

of rHLF protein, and is currently studying its utility as a novel, orally administered, preventive treatment for antibiotic-associated diarrhea (AAD) in at-risk adults who are hospitalized or who are residents of skilled nursing facilities. A significant number of AAD cases are caused by the opportunistic bacterial pathogen *Clostridium difficile*, which is difficult and expensive to treat, and which substantially increases mortality in hospitalized patients.

Colorado companies are also engaged in large-scale phase III safety and efficacy trials. Ampio Pharmaceuticals is developing Ampion™, a low molecular weight fraction of human serum albumin (HSA), for the treatment of osteoarthritis of the knee. The primary constituent ingredient of Ampion™ is aspartyl-aanyl diketopiperazine, or DA-DKP, an endogenous immunomodulatory molecule derived from the N-terminus of HAS. DA-DKP plays a signif-

icant role in the regulation of inflammation and is believed to reduce inflammation by suppressing pro-inflammatory cytokine production in T-cells. In February 2014, the company announced it had completed enrollment and dosing of patients in its second pivotal trial of Ampion™. Metabolic radiodiagnostic imaging company Cell>Point is developing universal oncology, cardiology, stroke and diabetes molecular imaging agents. Cell>Point is currently engaged in their phase III efficacy study to compare 99mTC-EC-DG SPECT/CT images versus 18F-FDG PET/CT images of primary lung cancer and metastatic lesions in an effort to demonstrate that SPECT/CT is not inferior to PET/CT for sensitivity or specificity measures when image interpretation of primary and metastatic lesions are compared against a truth standard in patients with a high likelihood of lung cancer. The Cell>Point lung cancer trial will be followed by phase IV trials in lymphoma, breast, liver, colorectal, prostate and head and neck cancers. ARCA biopharma, a biopharmaceutical company developing genetically-targeted therapies for cardiovascular diseases, is queuing up a phase III comparative effectiveness trial evaluating Gencaro™, a pharmacologically unique beta-blocker and mild vasodilator, as a potential treatment for the prevention of atrial fibrillation (AF) in patients with heart failure. ARCA has identified common genetic variations that it believes predict individual patient response to Gencaro™, giving it the potential to be the first genetically-targeted personalized medicine therapy approach for the prevention of AF.

The Colorado life science clinical landscape is not limited to therapeutics. There is a surfeit of 510(k) and PMA activity transpiring by a vast cohort of medical device companies throughout the state. EndoShape recently received 510(k)

A variety of Colorado medical devices are demonstrating great promise in the clinic.”

icant role in the regulation of inflammation and is believed to reduce inflammation by suppressing pro-inflammatory cytokine production in T-cells. In February 2014, the company announced it had completed enrollment and dosing of patients in its second pivotal trial of Ampion™. Metabolic radiodiagnostic imaging company Cell>Point



Ventria Bioscience



Surefire Medical



ValveXchange, Inc.

marketing clearance for its Medusa™ Vascular Plug. The FDA cleared the catheter-delivered device for arterial and venous embolization in the peripheral vasculature. The Medusa™ Vascular Plug is deployed through a catheter placed in the patient's bloodstream and occludes vessels in a single delivery sequence. Due to its non-metallic nature, the Medusa™ Vascular Plug produces minimal CT (Computed Tomography) artifacts. Encision, a surgical technology company focused on the prevention of stray electrosurgical burns in minimally invasive surgery, filed a premarket notification for its intent to market the EndoShield™ Burn Protection System. The EndoShield integrates Encision's patented Active Electrode Monitoring (AEM) technology into a disposable smart cord and eliminates the need for a separate AEM monitor. The EndoShield eliminates the risk of stray energy burns to patients and provides an intuitive, elegant interface for the user.

A variety of Colorado medical devices are demonstrating great promise in the clinic. A sampling of these companies and their potentially approved products include:

- **Surefire Medical**, which recently completed a randomized prospective study demonstrating that their infusion system technology (FDA approved) has the potential to improve the safety and efficiency of direct-to-tumor minimally invasive radiation therapy delivery to liver cancer patients.
- **Venaxis**, an in vitro diagnostic company focused on the development of a rapid, multiple biomarker-based assay for identifying patients that are at low risk for appendicitis, announced positive top-line results from its pivotal U.S. study. The Venaxis APPY1 Test performed well, with sensitivity and negative predictive value results that exceeded those from the previous pilot study. The company believes these pivotal results are sufficient for potential FDA clearance, and expects to finalize its 510(k) submission and file with the FDA in the first half of 2014.
- **Cerapedics**, an orthobiologics company focused on developing and commercializing novel peptide enhanced bone graft products based on its proprietary synthetic small peptide (P-15) technology platform, presented preliminary outcomes data from a FDA clinical trial for i-FACTOR™ Peptide Enhanced Bone Graft in anterior cervical discectomy and fusion procedures. According to preliminary analysis of the trial results, treatment with i-FACTOR showed statistically significant non-inferiority to the autograft control group for fusion rate, neck disability index scores and neurological outcomes. These and other results have not yet completed the final phase of quality testing, which could minimally affect final outcome data.

Medical Device in Colorado Companies with Operations in Colorado

- Baxter Healthcare Corporation
- Cochlear Americas
- Covidien
- C. R. Bard, Inc./Medivance
- DePuy Synthes,
Companies of Johnson & Johnson
- Medtronic Navigation, Inc.
- Sorin Group
- Terumo BCT

- **ValveXchange** has successfully completed implants and patient enrollment in their VITAL-2 clinical trial for the Vitality Heart Valve System.™ The system incorporates a two-piece heart valve and allows a simple two-step implant procedure that provides excellent visibility into the aortic chamber. The design of the valve allows a surgeon to replace just the leaflet set later in life, without having to completely explant and remove the entire valve.

- **Colibri Heart Valve**, an emerging medical device company, reported findings from long-term follow-up of patients enrolled in the company's first-in-human study of its proprietary 24mm transcatheter aortic heart valve implantation system. The five patients enrolled in the study report continued successful outcomes with zero-to-trace paravalvular leak and a high retrained effective orifice area up to one year post implantation.

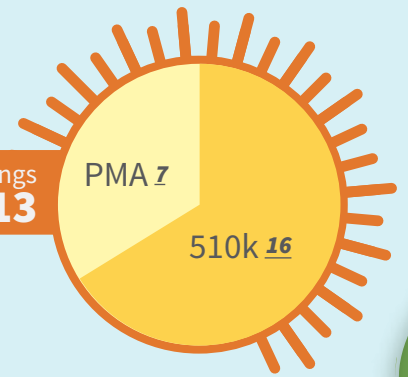
With a vast and talented pool of researchers, clinical operators, seasoned managers and serial executives, Colorado is building companies, incorporating cutting-edge life science technologies and skillfully pushing these assets, and more, into the clinic at an accelerating rate. Without a doubt, some degree of luck weighs in the calculus of drug, device and diagnostic approvals, but the intellectual horsepower and sophistication of the women and men in the Rocky Mountain life science ecosystem are the distinct advantages behind filling the Colorado clinical asset funnel—and bringing more and more new and innovative products to the steps of the FDA for approval. 🌐

Where do THx, Dx & Tx meet?

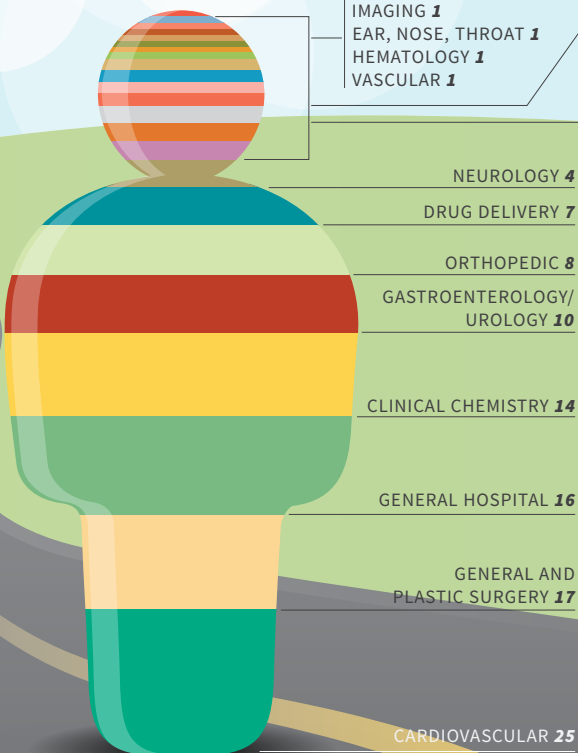


**THE CROSSROADS WHERE ASSETS IN
DRUG, DEVICE & THERAPY INTERSECT**

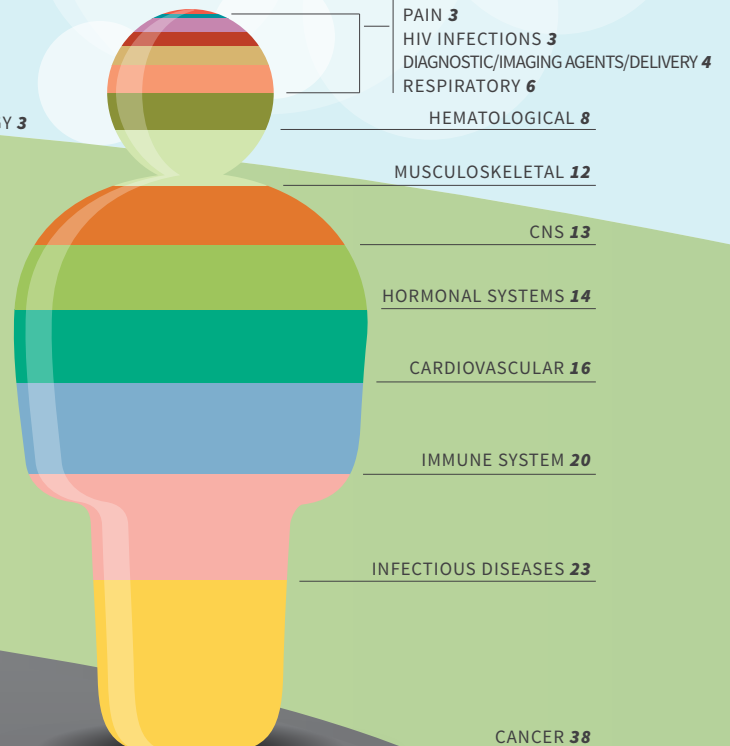
Number of Filings
2013



MED DEVICES (approved and investigational)

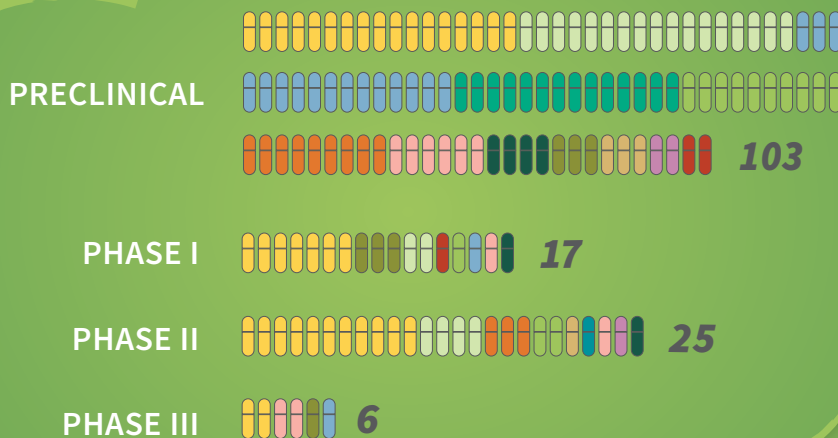


DRUGS in clinical trials



DRUGS

by phase & therapy area



- CANCER
- CARDIOVASCULAR
- CNS
- DIAGNOSTIC/IMAGING AGENTS/DELIVERY
- EYE AND EAR
- GENITOURINARY
- HEMATOLOGICAL
- HIV INFECTIONS
- HORMONAL SYSTEMS
- IMMUNE SYSTEM
- INFECTIOUS DISEASES
- MUSCULOSKELETAL
- PAIN
- RESPIRATORY

INVESTIGATIONAL

MEDICAL DEVICES

Companies ranked in order of the number of investigational devices.

- SPECTRANETICS CORP. **15**
- CORGENIX **11**
- NSPIRE HEALTH **13**
- ALLOSOURCE **9**

- | | |
|------------------------------|-----------------------------------|
| Zynex Medical Inc. 6 | Sandhill Scientific Inc. 3 |
| Surefire Medical 5 | Venaxis Inc. 3 |
| Boulder Diagnostics 3 | Angioslide 2 |
| Hepquant LLC 3 | C5 Medical Werks 2 |
| Indevr LLC 3 | Cerapedics LLC 2 |
| Mbio Diagnostics 3 | Sophonon Inc. 2 |

Companies with 1 investigational device:

Aktivax, Ampio Pharmaceuticals Inc., Aqueous Biomedical, Beacon Biotechnology, Biondesix Inc., Colibri Heart Valve LLC, Davita Inc., Endoshape, FitBionic, Integrated Laser, Therapies, Medical Simulation Corporation, Medivance Inc., Parascript LLC, Regenerative Sciences Inc., Shape Ophthalmics LLC, Somalogic Inc., Sporian Microsystems, ST Cardio Technologies, Stndrd Infusion Inc., ValveXchange Inc., Westone Laboratories Inc.

APPROVED

MEDICAL DEVICES

Companies ranked in order of the number of approved devices.

- SPECTRANETICS CORP. **125**
- CORGENIX **23**
- UNIPATH LLC **73**
- SANDHILL SCIENTIFIC INC. **16**



- | | |
|----------------------------------|------------------------------------|
| Encision Inc. 8 | AlloSource 2 |
| Genesee Biomedical Inc. 7 | Zynex Medical 2 |
| Medivance Inc. 7 | C5 Medical Werks 1 |
| Angioslide 5 | Davita Inc. 1 |
| Asi Medical Inc. 5 | Ibalance Medical Inc. 1 |
| Mesa Laboratories Inc. 5 | Lifeloc Technologies Inc. 1 |
| Protomed Inc. 5 | Oralabs Holding Corp. 1 |
| Surefire Medical 5 | Robinson Medsurg LLC 1 |
| Sophonon Inc. 4 | ST Cardio Technologies 1 |
| Genesis Laboratories 3 | |
| Pharmajet Inc. 3 | |

Webb-Waring

BIOMEDICAL RESEARCH

PROGRAM

BY KRISTI ARELLANO



W

hen the leadership of the Boettcher Foundation set about establishing its Webb-Waring Biomedical Research Awards, one of the primary aims was to ensure that the funding was focused in an area where it would have the greatest impact. After intensive research and thoughtful consideration, it was determined that providing support to early career investigators during that critical gap between working under other researchers and securing major independent funding would be the most effective area the Foundation could support.

Now, just four years after the first recipients were selected, early signs indicate that the program is achieving its aim of helping early career investigators catapult their research to the next level. The original award recipients have begun to cycle out of their funding years, and all of them have gone on to receive major funding to continue their biomedical research.

“While the Webb-Waring Biomedical Research Awards program is still relatively young, we are excited by early results that show Boettcher Investigators are going on to receive major funding from the National Institutes of Health and other federal and private research funders,” said Timothy W. Schultz, President and Executive Director of the Boettcher Foundation.

The Webb-Waring Biomedical Research Awards were created as the result of an innovative agreement among the Boettcher Foundation, the Webb-Waring Foundation for Biomedical Research and the University of Colorado. Founded in 1924 by Dr. Gerald B. Webb and later directed by Dr. James J. Waring, the Webb-Waring Institute has made significant contributions to the advancement of biomedical research, doing so largely by engaging in basic and clinical research and training research scientists. Much of the Institute’s work was supported by a separate but related entity known as the Webb-Waring Foundation.

The Webb-Waring Institute became part of the University of Colorado in 2008. At that time, the assets of the Webb-Waring Foundation were entrusted to the Boettcher Foundation, whose history of philanthropic giving in Colorado stretches back to 1937. The Boettcher Foundation and the University of Colorado also committed to matching Webb-Waring monies to create a new and permanent funding stream for biomedical research in the state.

When the Foundation agreed to both steward and match the Webb-Waring assets, its leadership saw an incredible opportunity to advance the growth and development of the state’s scientific and medical minds. But that opportunity also came with a significant responsibility. As a conscientious steward of Webb-Waring’s funds and as a donor with a strong desire to give in the most effective and impactful way possible, the Boettcher Foundation devoted a significant amount of time and resources to determining the area where its funding would have the most impact.

The Foundation looked at issues and funding gaps at each stage along the biomedical research continuum. After much deliberation, it honed in on the funding gap for early career investigators. These promising investigators, often within a few years of their first academic appointments, spend their early years working in mentors’ labs and are ready to contribute original work to the biomedical knowledge base.

“Funding for early career research is often scarce,” said April Giles, President & CEO of the Colorado BioScience Association. “Early-stage investigators face difficulty competing for significant federal or private grants that will help move them into their own exciting areas of discovery.”

Recipients of Webb-Waring Biomedical Research Awards, who become known as Boettcher Investigators, are awarded grants of \$225,000, covering up to three years of research with a goal for them to establish themselves and become competitive for major awards from federal agencies and private foundations.

Now that the original award recipients are winding up their funding years, they are providing early proof that the Boettcher Foundation’s approach is an effective one. All of the Boettcher Investigators who have completed their funding cycles have been awarded significant grants from NIH or other major research funders. And while the sample is still small, early data indicates that the average age for Boettcher Investigators to get their first major funding awards is 38, which is significantly lower than the national average of 44.

The original award recipients have begun to cycle out of their funding years, and all of them have gone on to receive major funding to continue their biomedical research."



“My Boettcher-supported research allowed my lab to generate the preliminary data necessary to successfully compete for NIH funding, which will sustain my lab for several years,” said Boettcher Investigator Gidon Felsen, Ph.D.

Felsen is an Assistant Professor of Physiology and Biophysics at the University of Colorado Anschutz Medical

Now that the original award recipients are winding up their funding years, they are providing early proof that the Boettcher Foundation’s approach is an effective one.”

Campus. His research focuses on the neural circuits underlying decision-making and goal-directed behavior. His lab uses electrophysiological, behavioral, molecular and computational methods to study how sensory input is transformed into motor output, using mouse models.

By understanding how movements are normally controlled, researchers can begin to prevent or repair conditions of disordered movement. Felsen is currently collaborating with a neurosurgeon to obtain neural recordings from patients with Parkinson’s disease while they are undergoing surgery. Ultimately, Felsen and his lab hope their data will lead to better therapies for movement disorders.

Felsen was awarded \$1.2 million in direct costs from the NIH to advance his research over five years. His story, and similar scenarios for other Boettcher Investigators are providing strong evidence that the Boettcher Foundation’s focus on early career investigators is setting these scientists up to have significant impact on understanding and improving human health.

For more information on the Boettcher Foundation, please visit www.BoettcherFoundation.org.

Early career investigators interested in applying for Webb-Waring Biomedical Research funding should visit their institution’s research department for more information.

2013 Class of Boettcher Investigators



Amrut V. Ambardekar, M.D.

Assistant Professor of Medicine—Cardiology, University of Colorado Anschutz Medical Campus. Myocardial recovery after ventricular assist device implantation.



Lucas Argueso, Ph.D.

Assistant Professor of Radiation and Cancer Biology, Colorado State University. Gene copy number variation.



Brad Borlee, Ph.D.

Assistant Professor of Bacteriology, Colorado State University. Molecular regulation of bacterial pathogenesis.



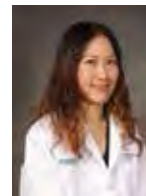
Joseph A. Brzezinski, Ph.D.

Assistant Professor of Ophthalmology, University of Colorado Anschutz Medical Campus. Mechanisms of retinal development and disease.



Melissa Krebs, Ph.D.

Assistant Professor of Chemical & Biological Engineering, Colorado School of Mines. Controlled delivery of therapeutics from biopolymer systems.



Soyeon Park, Ph.D.

Assistant Professor of MCDB, University of Colorado Boulder. Molecular mechanisms of proteasome biogenesis.



Abigail L. Person, Ph.D.

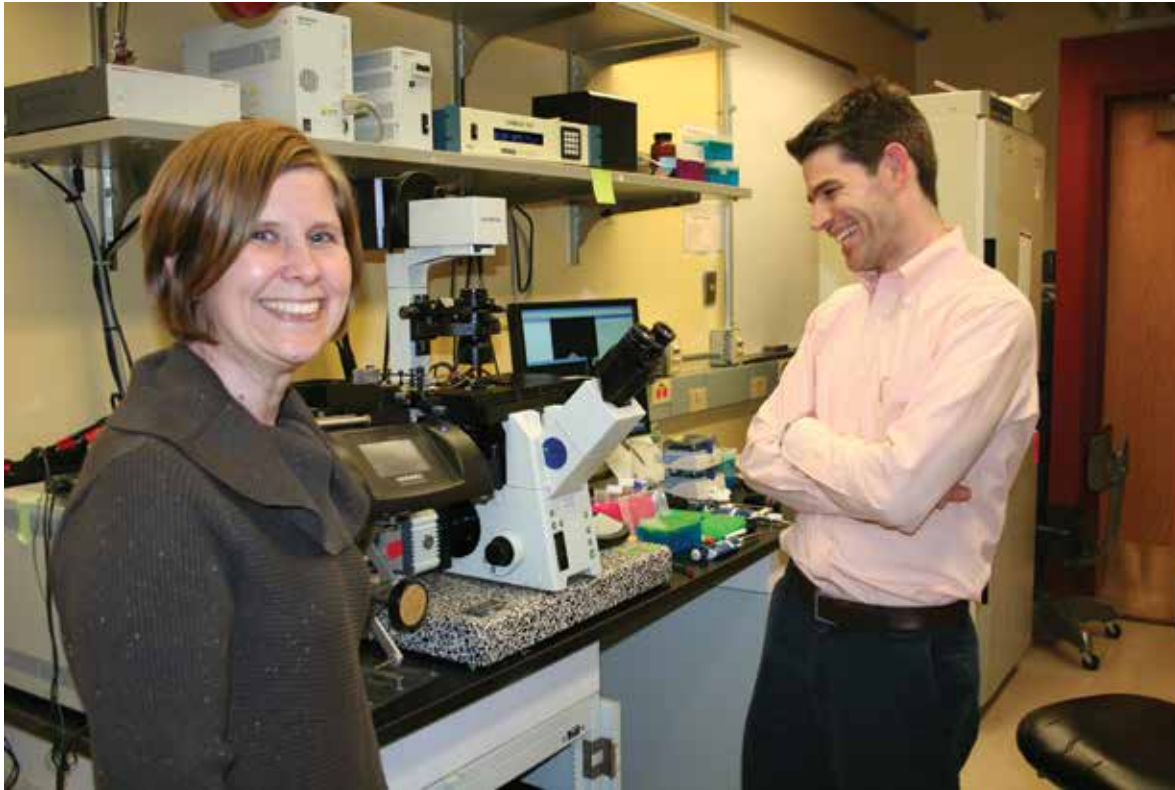
Assistant Professor of Physiology & Biophysics, University of Colorado Anschutz Medical Campus. Corollary discharge pathways underlying schizophrenia symptoms.



Michael Strong, Ph.D.

Assistant Professor of Genes, Environment, and Health, National Jewish Health. Genomics of respiratory disease associated pathogens.

Investigators Collaborate



Boettcher Investigators, Melissa Reynolds and Keith Neeves, combine their research to achieve remarkable results within the bioscience community.

While the goal of the Webb-Waring Biomedical Research program has been to support biomedical researchers during the early phases of their research careers, one of the most exciting results to come from it has been the connections made among these committed scientists.

As members of the first class of Boettcher Investigators selected in 2010, Keith Neeves and Melissa Reynolds are each making their own marks in the scientific community. Neeves, an assistant professor in the Department of Chemical and Biological Engineering at Colorado School of Mines, is studying the mechanisms of blood clotting. His research is focused on developing therapeutic strategies that could prevent excessive clotting, for example during surgical procedures, while also preventing bleeding. Meanwhile Reynolds, an assistant professor of chemistry with a joint appointment in biomedical engineering at Colorado State University, has focused on creating materials that will prevent the rejection of implantable devices in patients, particularly bio-rejection that is caused by blood clotting.

What the two have done together, however, has been equally remarkable and serves as a strong example of the type of collaboration the Boettcher Investigator grants can foster.

After sitting next to each other at the first orientation event for Boettcher Investigators, Neeves and Reynolds realized that both their research focused on blood clotting. The two began working together and, by pairing their separate research, were able to create an experiment that had previously never been conducted and holds incredible potential. Their findings have already proven significant enough for publication in the *Annals of Biomedical Engineering*.

Neeves and Reynolds like to point out that they were 74 miles away from each other but never knew about the other's research. "It's safe to say that without the Boettcher program, our paths wouldn't have crossed," Reynolds says.

Neeves adds that the collaboration evolved fairly quickly, following their initial meeting, and the students in their labs regularly collaborate. Both Neeves and Reynolds are quick to defer any praise for their research to the students who work in their labs, which isn't surprising for researchers who have each, separately, been selected as the Colorado BioScience Association's Educator of the Year. ©

FOUND IN TRANSLATION

BY JEANNE McADARA-BERKOWITZ, Ph.D.

When Malik Kahook, M.D., joined the University of Colorado School of Medicine's Department of Ophthalmology eight years ago, Department Chair Naresh Mandava, M.D., gave him a specific charge: to build out the department's clinical research capabilities and turn it into a world-class translational research center.

"We wanted to expand on our already rich clinical capabilities by bringing in a really diverse set of leaders in ophthalmology-focused translational research," says Kahook, who serves as the department's vice chair of clinical and translational research. "Our goal is to maintain an intense focus, from the very first day an idea is generated in the research lab, on how that idea will eventually apply to patients at the bedside."

The Rocky Mountain Lions Eye Institute—the clinical center within the department—is the only academic eye center within a 500-mile radius of Denver. Every year, more than 150,000 patients visit the Institute on the Anschutz Medical Campus and its satellite centers

at the University of Colorado Hospital, Denver Veterans Affairs Medical Center, Denver Health Medical Center and The Children's Hospital to receive care from more than 50 expert faculty. The Institute also houses the Rocky Mountain Lions Eye Bank, which serves Colorado and surrounding states by collecting, housing and distributing donated tissues for transplantation.

While still in progress, Kahook's work to date has been fruitful, leading to the filing of more than 20 patents for technologies developed within the Institute, multiple commercial out-licensing agreements to develop the technologies and the realization of new funding from philanthropic organizations. Over the past four years, the Institute has secured funding to triple its physical space so that all clinical and surgical resources can be housed in the same building, and thousands more patients can be accommodated each year. In the last year, two endowed chairs have been created in the department, led by major donations from members of the Anschutz and Slater families.

The Rocky Mountain Lions Eye Institute is the only academic eye center within a 500-mile radius of Denver.

Rocky Mountain Lions Eye Institute Translational Research Programs Focus on Innovative Treatment of Eye Diseases



The underlying driver of all of this activity is, of course, the research. Some of the programs that have been established under Kahook's tenure include:

- A team focused on the application of non-linear microscopy to ocular health and disease.

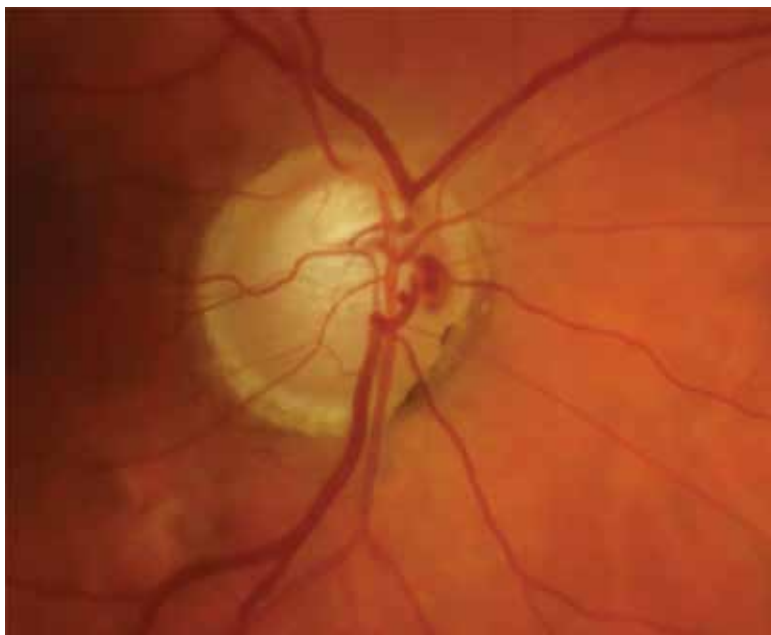
"This technology allows us to look not just at the macrostructure of the eye and its tissues, but also deep inside at specific cells' physiological function and dysfunction," says Kahook. "The group has already been able to file patents on their work and engage in collaborative projects with industry. The ultimate goal will be to take these devices into the clinic, where they'll allow us to diagnose and treat ocular diseases at an earlier stage than currently possible."

- A program devoted to research in the area of polymer science and engineering. The goal of this program is to enhance the functionality of medical devices by developing more biocompatible materials for ophthalmologic use.



Malik Y. Kahook, M.D.

The Slater Family Endowed Chair in Ophthalmology Vice Chair, Clinical & Translational Research Chief, Glaucoma Service & Director, Glaucoma Fellowship Professor of Ophthalmology University of Colorado Anschutz Medical Campus | Department of Ophthalmology



According to Kahook, “A lot of materials currently used in ophthalmological devices are basic silicone or other polymer-based materials, because these are easy to work with from a manufacturing perspective. The group here is working to develop ‘smart’ materials, meaning materials that are able to respond to changes in different stimuli like light, heat and hydration even after they’ve been incorporated into devices or implanted in the human ocular environment.”

- An initiative to use the faculty’s deep clinical and surgical experience to develop new, safe, efficacious approaches to treating blinding diseases and to enhance outcomes from cataract surgery. Examples include a device for non-invasive treatment of glaucoma, currently in early-stage clinical trials at a start-up company called OcuTherix (New Brighton, Minnesota), and a technology that stimulates failing retinal tissue in order to halt or even reverse the progression of macular degeneration and other retinopathies, currently being developed by 2C Tech Corporation (Irvine, California).

“Once we get the devices to a level where we have established pre-clinical validation of function, capability and biocompatibility, we quickly partner off-campus

with more nimble commercial enterprises, or with larger strategic partners that have the financial resources to conduct clinical trials,” says Kahook. “So far, we’ve seen a number of devices spun out of our labs here, either going to start-ups or to bigger companies like Abbot, HOYA, Glaukos, OASIS Medical and New World Medical, to name just a few.”

Kahook notes that the Institute is fortunate to have a local pool of top talent, both for forming productive academic and commercial collaborations, and for recruiting new investigators to the faculty.

“It’s been important to the department to collaborate as much as possible with local researchers on campus here, in Boulder and in Colorado Springs, and to bring them together with experts from industry,” he says. “These collaborations foster communication and innovation, and allow us to bring in new faculty such as polymer engineer Devatha Nair, who is in the process of joining the department from the laboratory of CU-Boulder Distinguished Professor Chris Bowman.”

For Kahook and his colleagues at the Institute, this is an exciting time to be performing translational research in Colorado, but he does echo the recurring call from others that lack of local venture funding presents a barrier to the future growth of Colorado’s bioscience industry.

“It’s a great topic of interest,” he says. “How do we keep more of these technologies in Colorado so we can achieve the most potential out of them before they go out into clinical use, when most of the money and big companies are outside? The technology we’re innovating in Colorado is so exciting, but we’re losing out on the downstream benefits.”

Kahook says that, for its part, the Institute is making every effort to keep technology development local. “We’re trying as hard as possible to find local partners for our work.” He laughs and adds, “Our doors are wide open, our phones are ready, and our email is waiting. We want to know who wants to partner with us—we’d love to sit down and chat.”

For Kahook and his colleagues at the Institute, this is an exciting time to be performing translational research in Colorado, but he does echo the recurring call from others that lack of local venture funding presents a barrier to the future growth of Colorado’s bioscience industry.”

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S P R I N T

Connecting

the

Dots

Tech Transfer Offices
Connect Research and
Marketplace to Stimulate
the State's Economy

BY STEVE PORTER

Moving game-changing life science research out of the laboratory and into the commercial marketplace is what the state's technology transfer offices (TTOs) are all about, and they're proving they're up to that challenge.

All four of Colorado's main TTOs push daily to obtain patent approval and to license the technology bubbling up from their institutions' talented researchers so that life-enhancing products and procedures can make our lives better and stimulate economic vitality.

Obviously, the bigger institutions are racking up the biggest numbers of inventions, patents, licenses and option agreements. But TTOs at all Colorado research institutions are connecting the dots between new technology and commercial production, helping to create new companies and new jobs.

In mid-February, the University of Colorado's Technology Transfer Office announced it had completed a licensing agreement with Tissue Fusion, a medical device startup in Colorado Springs spun out of CU's campus there.

Tissue Fusion, led by Michael Larson, the El Pomar Endowed Chair of Engineering and Innovation at

CU-Colorado Springs, has developed a laser-based device for closing wounds during nasal surgery.

The new device offers a revolutionary alternative to traditional scalpel surgery and has the potential to make the procedure faster and simpler, and also to shorten healing time and reduce side effects like swelling, scarring and infection.

"We're pleased to be working in partnership with the University of Colorado to commercialize a new medical technology that is already adding jobs to the Colorado economy," says Larson, who serves as Tissue Fusion's CEO.

Kate Tallman, CU's interim TTO assistant VP, said in mid-February that her office has issued 34 technology licenses and option agreements this fiscal year, with more than four months until year's end.

"We've had a lot of action recently," she says. "It's a real leading indicator of the economy."

At Colorado State University, 2013 was a banner year for tech transfer.

Todd Headley, president of CSU Ventures – the university’s tech transfer arm – says the year saw a record-breaking number of patents and startups created with \$110 million in licensed tech sales.

“We have a lot of good numbers in our report, and one of the things we highlight is the numbers employed by these (startup) companies – nearly 500 people,” he says. “That’s one of the real outcomes we can talk about.”

One of CSU’s biggest TTO success stories is Loveland-based Heska Corp., a campus spin-off that’s now a global leader in advanced diagnostic instruments and supplies for veterinarians.

More recently, CSU bioscience spin-offs VetDC and KromaTiD have been getting investor activity and moving farther into the marketplace.

The Colorado School of Mines’ Office of Technology Transfer arrived as a dedicated tech transfer entity in 2005. Will Vaughan, director of Mines’ tech transfer office, says his daily focus is on helping Mines faculty understand the importance of moving their research to the marketplace.

“In the last five or six years there’s been the realization that there is a lot of good stuff here and we should be capitalizing on that and getting it out to the public,” he notes.

That effort has been paying off, Vaughan says, with Mines’ tech transfer office having one of its best years in 2013, including a tripling of invention disclosures.

“Basically everything’s gone up – everything’s on the upswing,” he says. “It’s been about Mines building on its strengths – energy, water, materials. And we’ve made a concerted effort to bolster our biological sciences and making strategic hires.”

The tech transfer office at National Jewish Health (NJH) in Denver is a much smaller operation than its counterparts at Mines, CSU and CU, but it’s fulfilling the same mission and bringing groundbreaking technology to market.

Emmanuel Hilaire, NJH’s TTO manager, cites as an example KneeTap™, a medical device that distends the synovial fluid out of a knee’s joint space and guides the physician directly into the synovial fluid.



Photos are copyright CSU Ventures, photography by Dan Bihn

Douglas Thamm, V.M.D., ACVIM Diplomate (Oncology), Head of Clinical Affairs, VetDC
Dr. Thamm is an Associate Professor and Barbara Cox Anthony Chair in Oncology and the Director of Clinical Research at Colorado State University’s Flint Animal Cancer Center.



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The patent for KneeTap™ is owned by NJH and exclusively licensed to Arthroventions LLC, a Colorado company co-founded by Dr. Richard Meehan, a professor and rheumatologist at NJH.

“Basically everything’s gone up—everything’s on the upswing,” he says. “It’s been about Mines building on its strengths—energy, water, materials. And we’ve made a concerted effort to bolster our biological sciences and making strategic hires.”

Hilaire said the device is only beginning to show its potential and its development has been possible thanks to funding from the State of Colorado and NJH.

“It’s applicable to any joint, really,” he says. “Now it’s being used for knees, but it could be applicable to ankles and elbows as well.”

While the work involved with tech transfer can be long and sometimes difficult – especially for biomedical

technology, which can take five to 15 years to fully launch – all four tech office leaders say they love it.

“It’s intellectually stimulating,” says Hilaire. “It’s working with top-notch doctors, and helping to do some good for the general public and for the state.”

“My favorite part of the job is that I get to go talk to really smart people, and they tell me the most recent, ground-breaking things they’re working on,” says Vaughan.

“One of the things I like about this job is that it’s at the intersection of law and business and science, all of which I enjoy,” says Headley.

“Seeing companies become successful and get products in the market – that’s what drives us every day.”

“For me, one of the best parts of the job is supporting a new generation of faculty, many of whom want to be entrepreneurs as well as faculty,” says Tallman.

“It’s an opportunity and a challenge to support them.”

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COLORADO by the NUMBERS

Financing and Acquisitions

2012-2013 YEAR IN REVIEW

2013 Financings

Company	Public Ticker	Close Date	City	\$ USD M	Type of Event/Round	Investor/Partner	Industry Type
AktiVax, Inc.		02/25/13	Aurora	.20	Venture Financing	CID4	Medical Device
Aktiv-Dry, LLC		06/01/13	Boulder	.44	Grant Funding	NIH	Biotech
Ampio Pharmaceuticals, Inc.	AMPE	09/26/13	Greenwood Vlg.	25.0	Stock Offering		Pharmaceutical
Arca Biopharma, Inc.	ABIO	05/30/13	Broomfield	20.0	Stock Offering		Pharmaceutical
Array BioPharma, Inc.	ARRY	07/29/13	Boulder	undisclosed	Alliances	Global Blood Therapeutics	Biotech
BaroFold, Inc.		06/01/13	Aurora	.1	Grant Funding	BDEGP	Biotech
Biodesix, Inc.		04/11/13	Boulder	undisclosed	Alliances	Bruker Daltonics	Diagnostics
Biodesix, Inc.		04/12/13	Boulder	8.8	Stock Offering/Series D		Diagnostics
Biodesix, Inc.		12/02/13	Boulder	8.3	Preferred Equity Financing/ Series E		Diagnostics
BiOptix Diagnostics, Inc.		03/14/13	Boulder	5.0	Venture Financing	Boulder Ventures Ltd.	Diagnostics
Bolder Biotechnology, Inc.		03/08/13	Boulder	1.0	Grant Funding	NIH	Biotech
Bolder Biotechnology, Inc.		05/15/13	Boulder	.48	Grant Funding	NIH	Biotech
Corgenix Medical Corporation	CONX	05/22/13	Broomfield	undisclosed	Alliances	Eli Lilly	Diagnostics
Corgenix Medical Corporation	CONX	07/11/13	Broomfield	undisclosed	Alliances	EDP Biotech	Diagnostics
Corgenix Medical Corporation	CONX	09/04/13	Broomfield	1.5	Financing Agreements	Bank of the West	Diagnostics/Therapeutics
Corgenix Medical Corporation	CONX	10/28/13	Broomfield	undisclosed	Alliances	Health Diagnostic Laboratory, Inc.	Diagnostics
Corgenix Medical Corporation	CONX	11/18/13	Broomfield	undisclosed	Alliances	Zalgen Labs	Diagnostics
Crestone, Inc.		07/01/13	Aurora	1.0	Grant Funding	NIH	Biotech
dbMEDx, Inc.		12/20/13	Littleton	.249	Grant Funding	AI	Medical Device
dbMEDx, Inc.		04/04/13	Littleton	1.1	Stock Offering		Medical Device
Entero Track		06/01/13	Centennial	.25	Grant Funding	BDEGP	Diagnostics/Therapeutics
Flashback		01/30/13	Boulder	.8	Angel	Angel Investment Group	Medical Device Software
Flashback		03/26/13	Boulder	.1	Grant Funding	STTR Ph III	Medical Device Software
FitBionic		08/08/13	Boulder	2.2	Venture Financing	High Country Venture	Medical Device
Globeimmune, Inc.		09/04/13	Louisville	4.0	Grant Funding	NIH	Biotech
Globeimmune, Inc.		10/31/13	Louisville	60.0	Stock Offering		Biotech
InDevr, Inc.		02/01/13	Colorado	.98	Grant Funding	NIH	Diagnostics/Therapeutics
Lanx, Inc.		05/13/13	Broomfield	15.0	Venture Financing/ Series C	Credit Suisse Asset Management	Medical Device
Lohocla Research Corporation		07/15/13	Aurora	.15	Grant Funding	NIH	Biotech
MBC Research, Inc.		06/01/13	Aurora	.24	Grant Funding	NIH	Biotech
MBC Research, Inc.		09/26/13	Aurora	.77	Grant Funding	NIH	Biotech
Mbio Diagnostics, Inc.		03/01/13	Boulder	.78	Grant Funding	NIH	Diagnostics/Therapeutics
Mbio Diagnostics, Inc.		04/24/13	Boulder	undisclosed	Alliances	Foundation for Innovative New Diagnostics (FIND)	Diagnostics/Therapeutics
Mbio Diagnostics, Inc.		07/08/13	Boulder	.68	Grant Funding	NIH	Diagnostics/Therapeutics
Mbio Diagnostics, Inc.		08/02/13	Boulder	.93	Grant Funding	NIH	Diagnostics/Therapeutics
Membrane Protective Technologies, Inc.		12/20/13	Fort Collins	.125	Grant Funding	AI	Biotech

2013 Financings *Continued*

Microbiome Therapeutics		12/16/13	Broomfield	1.3	Financing Agreements		Biotech
nSpire Health		03/21/13	Longmont	undisclosed	Alliances	4sigma GmbH	Diagnostics
OptiEnz Sensors, LLC		09/10/13	Fort Collins	undisclosed	Grant Funding	NSF SBIR	Diagnostics
Quspin		09/24/13	Westminster	.57	Grant Funding	NIH	Medical Device
Shape Ophthalmics, LLC		06/17/13	Denver	undisclosed	Alliances	OASIS Medical Inc.	Medical Device
Sharklet Technologies, Inc.		07/18/13	Aurora	.2	Grant Funding	NIH	Medical Device
Sharklet Technologies, Inc.		09/17/13	Aurora	1.10	Grant Funding	NIH	Medical Device
SixOne Solutions		06/01/13	Aurora	.05	Grant Funding	BDEGP	Biotech
SixOne Solutions		07/17/13	Aurora	.29	Grant Funding	NIH	Biotech
SmartMove		05/24/13	Fort Collins	.36	Grant Funding	NIH	Biotech
SmartMove		06/01/13	Fort Collins	.2	Grant Funding	BDEGP	Biotech
Somalagic, Inc.		08/12/13	Boulder	undisclosed	Alliances	Agilent Technologies Inc.	Diagnostics
Somalagic, Inc.		08/21/13	Boulder	10.0	Venture Financing		Medical Device
Surefire Medical		09/23/13	Westminster	16.4	Venture Financing		Medical Device
Surefire Medical		11/07/13	Westminster	18.2	Venture Financing	Partisan Management Group	Medical Device
SuviCa, Inc.		09/12/13	Boulder	.25	Grant Funding	NIH	Biotech
Tissue Fusion		06/01/13	Colorado Sprgs.	.075	Grant Funding	BDEGP	Medical Device
Ventria Bioscience		02/15/13	Fort Collins	.23	Grant Funding	NIH	Biotech
Ventria Bioscience		06/01/13	Fort Collins	.82	Grant Funding	NIH	Biotech
Ventria Bioscience		09/20/13	Fort Collins	.23	Grant Funding	NIH	Biotech
VetDC, Inc.		12/20/13	Fort Collins	.249	Grant Funding	AI	Biotech
VetDC, Inc.		05/01/13	Fort Collins	1.3	Venture Financing	Angel Investors	Biotech
VetDC, Inc.		11/01/13	Fort Collins	1.1	Venture Financing	Angel Investors	Biotech
ViroCyt, LLC		01/15/13	Denver	undisclosed	Venture Financing	High Country Venture	Diagnostics/Therapeutics
Xalud Therapeutics, Inc.		02/08/13	Boulder	.69	Grant Funding	SBIR	Biotech
Xalud Therapeutics, Inc.		06/01/13	Boulder	.222	Grant Funding	BDEGP	Biotech
Zynex Medical Holdings	ZYNX	07/22/13	Lone Tree	undisclosed	Alliances	Advanced Brain Monitoring	Medical Device

2012 Financings

Company	Public Ticker	Close Date	City	\$ USD M	Type of Event/Round	Investor/Partner	Industry Type
Accelr8	AXK	04/23/12	Denver	35.0	Debt/Non-Equity		Medical Device/Diagnostic
Accelr8 /Denver Health	AXK	05/15/12	Denver	2.0	Grant	Defense Medical Research and Development Program (DMRDP)	Medical Device/Diagnostic
Accera, Inc.		07/18/12	Broomfield	undisclosed	Later Stage	Nestle S.A.	Biotech/Pharma
AktiVax, Inc.		03/21/12	Aurora	.1	Venture Financing	CID4	Medical Device/Diagnostic
AmideBio		03/01/12	Louisville	.25	Grant	BDEGP	Biotech/Pharma
Biodesix, Inc.		08/29/12	Boulder	12.0	Later Stage		Medical Device/Diagnostic
Breakthrough Products, Inc./ UrgentRX		05/21/12	Denver	3.0	First Round	JUMP Investors	Biotech/Pharma
Cell Point, LLC		05/24/12	Centennial	2.8	Later Stage		Biotech/Pharma
Cerapedics, Inc.		07/12/12	Westminster	19.0	Later Stage	MedImmune Ventures	Biotech/Pharma
Carbo Analytics, LLC		03/01/12	Fort Collins	.25	Grant	BDEGP	Medical Device/Diagnostic
Crestone, Inc.		03/01/12	Boulder	.25	Grant	BDEGP	Biotech/Pharma
Evolutionary Genomics, Inc.		06/25/12	Lafayette	.44	Later Stage		Biotech/Pharma
Flashback		03/01/12	Boulder	.05	Grant	BDEGP	Medical Device/Diagnostic
InDevR, LLC		02/23/12	Boulder	5.8	Grant	Defense Advanced Research Projects Agency (DARPA)	Medical Device/Diagnostic
Inviragen, Inc.		01/23/12	Fort Collins	.31	Second Round		Biotech/Pharma
Lanx, Inc.		09/10/12	Broomfield	8.69	Later Stage		Medical Device/Diagnostic
Mbio Diagnostics, Inc.		10/31/12	Boulder	3.8			Medical Device/Diagnostic
Miragen Therapeutics, Inc.		04/10/12	Boulder	20.0	Second Round	Remeditex Ventures LLC	Biotech/Pharma
Onkure, Inc.		03/01/12	Longmont	.25	Grant	BDEGP	Biotech/Pharma
PharmaJet, Inc.		10/12/12	Golden	2.0	Debt/Non-Equity		Medical Device/Diagnostic
Shape Ophthalmics, LLC		03/01/12	Aurora	.15	Grant	BDEGP	Medical Device/Diagnostic
Sharklet Technologies, Inc.		12/07/12	Aurora	2.00	Second Round	Altria Group Inc.	Medical Device/Diagnostic
Siva Therapeutics		12/03/12	Boulder	.35	Angel		Biotech/Pharma
Sophonon, Inc.		08/14/12	Boulder	.25	Grant	BDEGP	Medical Device/Diagnostic
Sophonon, Inc.		08/14/12	Boulder	7.0	First Round	Wexford Capital	Medical Device/Diagnostic
St. Renatus, LLC		01/09/12	Fort Collins	3.5		Angel	Biotech/Pharma
Suvica Inc		03/01/12	Boulder	.125	Grant	BDEGP	Biotech/Pharma
Ventria Bioscience/ InVitria Division		06/04/12	Fort Collins	1.5	Grant	Small Business Innovation Research Program (SBIR)	Biotech/Pharma
VetDC, Inc.		11/29/12	Fort Collins	1.5	Private financing		Biotech/Pharma
ZeaChem, Inc.		10/29/12	Lakewood	25.0	Series C	ITOCHU Corporation	BioFuels
ZeaChem, Inc.		02/23/12	Lakewood	40.0	Grant	USDA's National Institute of Food and Agriculture (NIFA)	BioFuels

2012-2013 Acquisitions

2013 Acquired by Colorado Company

Company	Close Date	City	\$ USD	Acquired	Location	Industry Type
Davita, Inc.	01/07/13	Denver	undisclosed	Fresenius Medical Care	Portugal/Poland	Medical Device
Spectranetics Corporation	01/07/13	Colorado Springs	5.5 + milestone pymts.	Upstream Peripheral Technologies, Ltd.	Israel	Medical Device
Terumo BCT	03/20/13	Lakewood	undisclosed	Medservice	Poland	Medical Device
Davita, Inc.	05/21/13	Denver	4.42 B	HealthCare Partners, LLC	Torrance, CA	Medical Device
Terumo BCT	11/04/13	Lakewood	undisclosed	GADA	Turkey	Medical Device
Clovis Oncology, Inc.	11/19/13	Boulder	196 M	EOS S.p.A.		Biotech

2013 Acquired Outside of Colorado

Company	Close Date	City	\$ USD	Acquired by	Location	Industry Type
Sound Surgical Technologies, LLC	01/29/13	Louisville	35.5 M	Solta Medical, Inc.	Hayward, CA	Medical Device
Inviragen, Inc.	05/08/13	Fort Collins	35 M	Takeda America Holdings, Inc	Japan	Biotech
Lanx, Inc.	08/07/13	Broomfield	undisclosed	Biomet, Inc.	Warsaw, IN	Medical Device

2012 Acquired Outside of Colorado

Company	Close Date	City	\$ USD	Acquired by	Location	Industry Type
MedEfficiency	03/29/12	Wheat Ridge	14.5 M	Derma Sciences	Princeton, NJ	Medical Device
Synthes, Inc.	06/14/12	Monument	19.7 B	Johnson & Johnson	New Brunswick, NJ	Medical Device
Allos Therapeutics	09/06/12	Westminster	Stock	Spectrum Pharmaceuticals	Henderson, NV	Biotech
Macleod Pharmaceuticals	10/02/12	Fort Collins	Stock	Neogen Corporation	Lansing, MI	Biotech
Aegis Analytical Corp.	10/23/12	Lafayette	30 M	Accelrys, Inc.	San Diego, CA	Software

2012-2013 New Companies

2013

Company	City	Industry Type
Gates Biomanufacturing Facility	Aurora	Biotech
Membrane Protective Technologies Inc. (MPTI)	Fort Collins	Biotech
Mycotechnology	Aurora	Biotech
Ocugen	Aurora	Biotech
Precision Biopsy	Aurora	Diagnostics
SixOne Solutions	Aurora	Biotech
Tissue Fusion	Colorado Springs	Medical Device
Verkko Biomedical	Aurora	Biomaterials
Z Biotech	Aurora	Biotech

2012

Company	City	Industry Type
Aurora Oncology, Inc.	Aurora	Biotech/Pharma
Cetya Therapeutics, Inc.	Fort Collins	Biotech/Pharma
Colorado Micro Tech	Fort Collins	Biotech/Pharma
Double Helix, LLC	Boulder	Medical Device/Diagnostic
Hyperion Labs, LLC	Fort Collins	Medical Device/Diagnostic
MonImmune Therapeutics	Fort Collins	Biotech/Pharma
OpTmune	Boulder	Biotech/Pharma

Data source: BioPharma Insight



GRANT PROGRAMS: INNOVATION ENGINES

Over the past eight years Colorado has developed comprehensive grant programs to build the state's bioscience ecosystem.

Initially, the Bioscience Discovery Evaluation Grant Program (BDEGP) was created in statute in 2006 to support the development of novel technologies and advance commercialization. The State saw the success of the BDEGP as a catalyst to induce continued growth and created the Advanced Industries (AI) Programs, through legislation in 2013, to align with seven advanced industries—aerospace, technology, engineering, energy, electronics, manufacturing and bioscience. The economic impact of these industries account for nearly 30 percent of the state's wage earnings, nearly 30 percent of the total sales revenues across all industries within the state and nearly 35 percent of the state's total exports.

In January of 2015, the BDEG Program will become a part of the larger Advanced Industries (AI) Programs which, will continue to drive innovation, increase access to early stage capital and support commercialization.

The Advanced Industries Program provides three grant types—Proof of Concept, Early Stage Capital and Retention, as well as Infrastructure. Additionally, the Advanced Industries Export Grant Program supports small and medium-sized business in the advanced industries and offsets international business development and related marketing costs.

The BDEGP has granted 220 grants since 2006 totaling approximately \$27 million. The complete economic impact of this funding has been significant. The Program has created 45 new companies, 381 direct jobs and \$456.9 million in additional investment, therefore leveraging the State's investment 17 times the initial amount.

In the first two cycles of the AI Program a total of \$4,798,855 was awarded through the Advanced Industry Accelerator Program for both Proof-of-Concept and Early Stage Capital and Retention Grants, across the total seven industries: advanced manufacturing, aerospace, bioscience, electronics, energy and natural resources, engineering and information technology.

These two programs exemplify the importance of investment to promote growth and sustainability to drive innovation, accelerate commercialization and encourage public-private partnerships.

Proof-of-Concept Grants

2013-2014



Investigator: Chris Cox, Ph.D. and Kent Voorhees, Ph.D.

Title: Pre-commercial proof-of-concept and validation of rapid *Listeria* detection and screening technology

Research: The key aims of this work are to demonstrate a handheld phage amplification based, surface enhanced Raman spectroscopy-enhanced lateral flow immunoassay device and conduct rigorous validation for its use in *Listeria* detection.

Impact: Listeriosis is an infection resulting from the ingestion of the bacterial pathogen *Listeria monocytogenes* in contaminated food. Listeriosis ranks among the most dangerous and challenging to prevent food-borne illnesses in the U.S.

Research: The goal of this project is to develop antimicrobial meshes for medical devices. These materials will utilize hydrophilic plasma surfaces, nitric oxide as a therapeutic agent, and biodegradable polymers as drug carriers, in random 3D configurations. Additional studies will focus on evaluating the processability and shelf-life of the materials, further demonstrating their commercial feasibility to medical device manufacturers.

Impact: The CDC has recently estimated that two million people or more are infected annually with antibiotic-resistant bacteria that will claim at least 23,000 lives in the United States. This problem is compounded by the extreme resistance to antibiotics and other antimicrobial agents that is a direct result of bacterial growth in a biofilm. The technology being developed under this project will inhibit the formation of biofilms on medical devices and in wounds.



Investigator: Eugene Chen, Ph.D.

Title: Sustainable and High-Performance Bioplastics from Renewable Plant Biomass

Research: The goals of this project are to demonstrate the scalability of processes for the production of high-performance bioplastics from two biomass-deliverable compounds and to develop a new, economically viable process for the preparation of one of the two compounds, in place of the current, multi-step synthesis also involving undesirable reagents.

Impact: The bioplastics being developed have potential applications as high-performance plastic optical fibers, aircraft windows, furniture and automobile parts, and electronic display materials.

Investigator: Salman R. Khetani, Ph.D.

Title: Micro-Engineered Liver Tissues for Drug Development Utilizing Induced Pluripotent Stem Cell Technology

Research: The goal of this project is to build a human liver model, which will include induced pluripotent stem cell-derived human hepatocytes and supportive stromal cells and to test the model with prototypical drugs for toxicity screening. The research will lead to a drug-screening platform for the pharmaceutical industry.

Impact: A key cause of pharmaceutical drug attrition is liver toxicity. This drug-screening platform could help identify toxic drugs at an earlier stage; thus increasing the speed at which new drugs reach the market, reducing the rate of attrition, and lowering the cost of pharmaceutical drugs by reducing development and approval costs.

Investigator: Ellen R. Fisher, Ph.D. and Melissa M. Reynolds, Ph.D.

Title: Plasma-Treated NO-Releasing Materials for Antimicrobial Medical Devices

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Investigator: Matt Kipper, Ph.D.

Title: Electrospun Bone Matrix Scaffolds to Improve Bone Healing

Research: The aim of this project is to develop a new demineralized bone matrix (DBM) nanofiber biomaterial for tissue engineering with improved biological properties. This new DMB biomaterial will be completely carrier-free and readily fabricated into a variety of forms for use in orthopedic surgery.

Impact: There are about 1.5 million bone graft procedures performed each year in the U.S. and about 2.2 million worldwide demineralized bone matrix (DMB) has long been used in orthopedic surgery as a bone substitute in bone graft procedures due to its osteoinductive signaling capacity. The DMB nanofiber biomaterial being developed under this project will have improved biological properties including improved osteoconductivity. Moreover, because it will be carrier-free, it can be used to repair bone defects caused by tumors.

Investigator: Matt Kipper, Ph.D.

Title: Co-Culture of Endothelial and Mesenchymal Cells to Vascularize Bone Allografts

Research: The objective of this project is to demonstrate that the surface coatings for bone allografts developed previously by this research group can support cells essential to blood vessel formation, which is critical to improving the outcome of bone allograft procedures. These coatings can help restore the healing capacity of allograft bone by delivering bone progenitor cells and protein signal cells.

Impact: Allografts, or bone grafts from cadaver tissue, are often used to heal large bone defects associated with a number of traumatic injuries and disease states. The surface coating being developed under this project will improve the chances of allograft success and, correspondingly, the quality of life of many patients receiving allografts.

Investigator: Kevin L. Lear, Ph.D.

Title: Prototype Optical Chip for Proteomics

Research: CSU researchers previously developed and patented a technology to enable inexpensive, portable

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biosensor chips for proteomics. The goal of this project is to demonstrate the functionality of the biosensor chip in a portable configuration.

Impact: The biosensor chips developed under this project could lower the costs of drug discovery research and provide a highly sophisticated, multiple analyte, point-of-care diagnostic for use in emergency care, pathogen detection, and personalized medicine.

Investigator: Ketul C. Popat, Ph.D., Susan James, Ph.D., Travis Bailey, Ph.D.

Title: Novel Silicone-Based Materials for Ocular Lenses

Research: The aim of this project is to develop novel, silicone-based materials for ocular lenses that are more hydrophilic and less inflammatory than conventional ocular lenses. The lens materials are enhanced with hyaluronan (HA) to make them more hydrophilic, reducing the potential for inflammatory responses.

Impact: An estimated 28 million to 38 million people in the US utilize contact lenses, while approximately 2.6 million artificial eye lens implantation procedures are performed in the US each year. Contact lens wear can induce dry eye symptoms and thin the precorneal tear film and interfere with the spreading of mucin onto the cornea. New intraocular and contact lens materials are needed that are more hydrophilic and less inflammatory and will eliminate the need for steroidal treatment as well as improve or maintain ocular health.

Investigator: Stephen Reynolds, Ph.D.

Title: Modified Bioaerosol Sampling for Influenza Virus in Agricultural Environments

Research: The goal of this project is to modify existing bioaerosol sampling devices and evaluate their ability to capture the influenza virus through critical laboratory assessments. Laboratory studies will evaluate the modified devices' ability to capture influenza viruses using

a bioaerosol chamber. The laboratory evaluations will also determine the minimal concentrations of influenza virus that can be detected in bioaerosols with this method.

Impact: The occurrence of avian influenza (AI) and highly pathogenic avian influenza (HPAI) in poultry operations is a major concern for production and occupational safety of workers in these facilities. Both AI and HPAI are highly infectious to poultry and humans, can cause severe morbidity and mortality, and may rapidly spread between flocks, particularly via bioaerosols. The modifications made to bioaerosol sampling devices under the project are expected to significantly improve the sensitivity of detection of the influenza virus in bioaerosols.

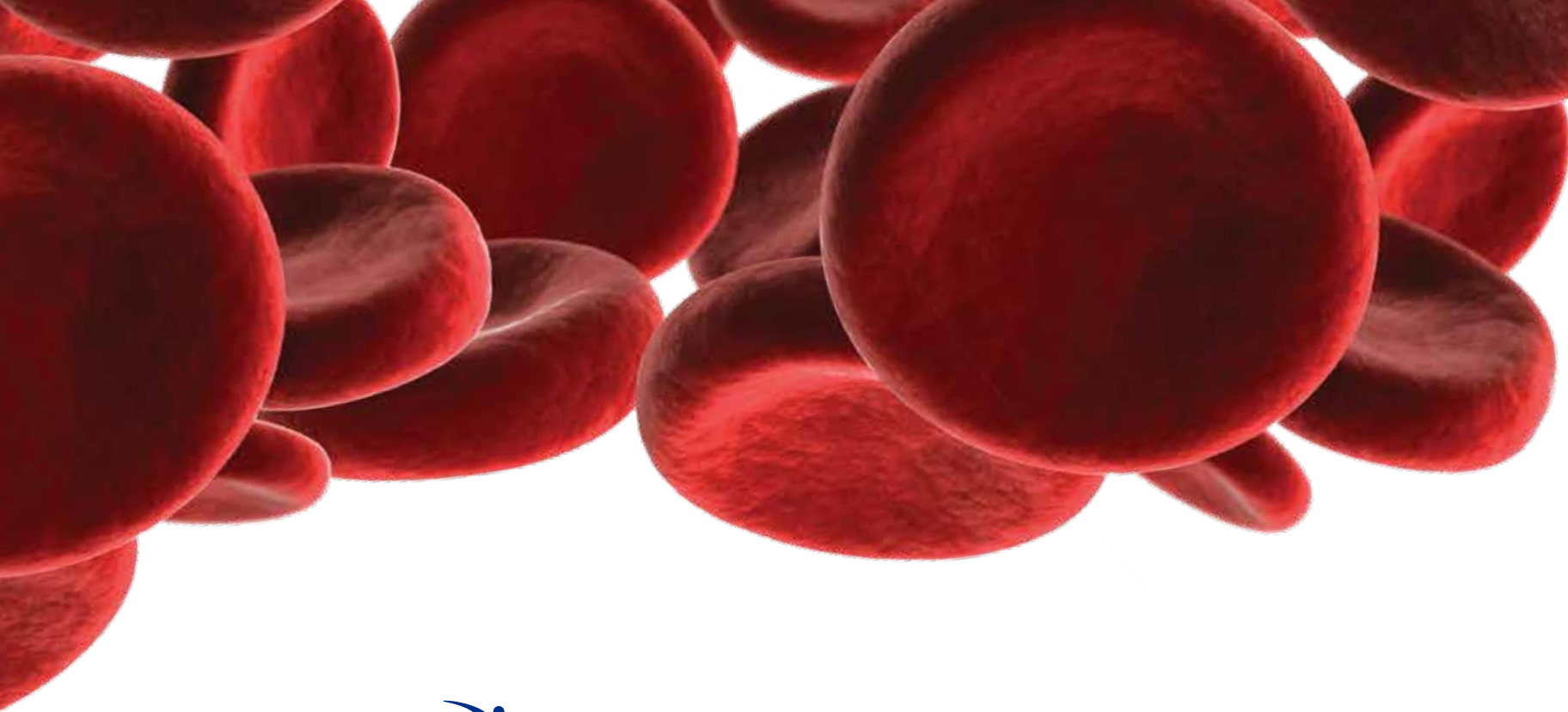
Investigator: Jorge Vivanco, Ph.D.

Title: Developing the First Generation of Symbiotics in Agriculture

Research: The research performed under this project will test specific, commercially available compounds and blends of compounds that, when applied to the soil, will promote beneficial soil microbe activities such as antagonism against pathogens, solubilization and acquisition of nutrients from the soil and the air, facilitation of seed germination, and general soil health. This technology will be ultimately developed as a seed treatment for high acreage crops such as maize and soybean.

Impact: As the world's population continues to grow, there is increasing need to optimize global agricultural production. By identifying blends of compounds that promote favorable microbial conditions, this project is a step towards improving agricultural systems. In 2012, the industry for biologics in agriculture was worth \$1.5 billion and, by 2020, biologics sales are projected to exceed \$4 billion, indicating the increasing demand for these compounds in the agricultural sector.





Investigator: Shaodong Dai, Ph.D. and John Kappler, Ph.D.

Title: Structural Maturation of Therapeutic Monoclonal Antibody Targeting Autoimmune Diabetes

Research: Type 1 diabetes (T1D) is an increasingly common, incurable autoimmune disease caused by pathogenic T cells. Our recent studies have identified a potential target for these pathogenic T cells that are believed to be responsible for T1D. The proposal aims at creating monoclonal antibodies (mono and bi-specific) that are inhibitory to this target. These antibodies will be engineered with high specificity to be more suitable as pharmacological agents. Their efficacy at inhibiting the pathogenic T cells and therefore T1D will be tested both in vitro and in vivo.

Impact: These monoclonal antibodies have the potential to become new drugs for the treatment of T1D. They would prevent T1D by eliminating the autoimmune attack of the pancreatic islets and would be very specific to the pathogenic T cells, therefore preserving the immune competency of the individual.

Investigator: Philippa Marrack, Ph.D., FRS

Title: Analysis of the Ability of the Vaccine Adjuvant Alum to Induce Cytotoxic T Cells in Humans

Research: The influenza virus varies from year to year in such a way that antibody responses against one strain of the virus are ineffective against the new strains that appear annually. Our preliminary results suggest that alum-adjuvanted vaccines induce, in mice, cross reactive

cytotoxic T cells, and that an alum-adjuvanted vaccine containing the appropriate influenza proteins might reduce the need for, and hence the cost of, new influenza vaccines each year. This proposal is aimed at validating this new approach in vaccine design.

Impact: This study could potentially lead to the creation of a new type of vaccine that is effective against various strains of the influenza virus (or other viruses) therefore circumventing the need to immunize the human population on a yearly basis.

Investigator: Milene Saavedra, M.D. and Vijaya Knight, MBBS, Ph.D.

Title: Utility of a CD64 Assay to Diagnose Acute Pulmonary Exacerbations in Cystic Fibrosis

Research: Cystic fibrosis (CF) is the most common inherited disease in the western world. Progression of CF lung disease is induced by episodic infectious events called acute pulmonary exacerbations. There is currently no biochemical test available to diagnose CF pulmonary exacerbations. Our preliminary results show that CD64 may serve as the ideal diagnostic molecule for CF pulmonary exacerbation. This proposal will aim at validating the utility of this CD64 biomarker.

Impact: This study would lead to the development of a diagnostic test for CF pulmonary exacerbations based on the measurement of CD64.

Investigator: David Riches, Ph.D. & Elizabeth Redente, Ph.D.

Title: Therapeutic Targeting of PTPN13 in Pulmonary Fibrosis

Research: Idiopathic pulmonary fibrosis (IPF) is a fatal lung disease that severely limits the ability of patients to breathe. Approximately 100,000 Americans are diagnosed with IPF every year and no effective treatment is currently available. In a previous study, we showed that the interaction of PTPN13 with Fas plays a critical role in the development of IPF. In this proposal we will identify small molecule inhibitors that would disrupt this interaction. The efficacy of these small molecules will be tested in an in vivo model of IPF.

Impact: The approach described above is particularly advantageous because it specifically inhibits the PTPN13 pathway without affecting the activity of other tyrosine phosphatases, which would otherwise be detrimental. The identification of these small molecules could lead to a new therapy for IPF.

Investigator: Michael Strong, Ph.D. and Jerry Nick, M.D.

Title: Development of a Pulmonary Microbiome Diagnostic Test to Monitor Chronic Respiratory Diseases including Cystic Fibrosis and non-CF Bronchiectasis

Research: Chronic respiratory diseases, including Cystic Fibrosis (CF) and non-CF bronchiectasis, are estimated to affect over 100,000 individuals in the US. These diseases are characterized by an increase in bacterial and fungal infections. In this study we will develop a rapid, accurate, and broad spectrum diagnostic to monitor and characterize potential bacterial and fungal microorganisms (microbiome) colonizing the lungs of patients with chronic respiratory diseases, including CF and non-CF bronchiectasis. The diagnostic will utilize targeted next-generation sequencing to quickly and accurately characterize the respiratory disease associated microbiome.

Impact: Our proposed strategy would lead to the development of a broad spectrum diagnostic test which purpose is to rapidly, accurately, and cost effectively characterize the lung microbiome associated with chronic respiratory diseases. This approach would enable a physician to identify potential pathogenic changes in the lung microbiome, monitor the effectiveness of a selected therapeutic regimen and enable therapies to be tailored to a particular composition.

Advanced Industry Accelerator Grant Program (AI):

Investigator: Richard Meehan, M.D. and Eric Hoffman

Title: The KneeTap™ Medical Device

Research: Arthritis or chronic joint symptoms are medical conditions that are affecting an increasing number of Americans. Aspirating synovial fluid from the joint space and/or injecting medication into the same area is a frequent but delicate out-patient procedure aimed at addressing these medical ailments. The aim of this proposal is to design and validate a novel and simple medical device, the KneeTap™, to facilitate this medical procedure. The device distends the synovial fluid out of the joint space and guides the physician directly into the synovial fluid.

Impact: The development of this device will make it easier for physicians to perform the diagnostic removal of joint fluid and injection of medication into joints with better accuracy and less discomfort to the patient.



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Investigator: Thomas R. Cech, Ph.D.

Title: Screening for Small Molecules Targeting the TEL Patch of TPP1 to Modulate Telomerase Recruitment to Telomeres

Research: This goal of this project is to identify small molecules that inhibit the survival of cancer cells by targeting the TEL amino acid patch, which plays an important role in recruiting telomerase to the binding of telomeres. The project will use a novel high-throughput screen to increase the potential of identifying small molecules with the potential to be developed into cancer therapeutics targeting a wide range of cancers.

Impact: It is estimated that 90% of all tumors depend on telomerase activity for survival, but currently no drugs targeting telomerase recruitment to telomeres exist. This type of drug could be a treatment option for the majority of cancer patients, making it potentially the most widely used cancer therapeutic, along with radiation- and chemo-therapy.

Investigator: Thomas E. Johnson, Ph.D.

Title: Pharmacological Abrogation of Injury Associated with Cryopreservation

Research: This project aims to develop new therapeutics to prevent the toxicity caused by the use of cryoprotectants used to prepare organ tissues for freezing for future transplantation. The project will use a unique high-throughput screen to identify the proteins responsible for this toxicity, then screen compound libraries for drugs that will inhibit the toxicity response.

Impact: This project could significantly improve the feasibility of cryopreservation of organs, which in turn would vastly increase the window of time that an organ remains viable for transplant.

Investigator: Xuedong Liu, Ph.D.

Title: Development of Proprietary, Highly Potent and Selective Histone Deacetylase 6 Inhibitors for Cancer

Research: The goal of this project is to further develop and benchmark proprietary HDAC6 (histone deacetylases) inhibitors by conducting extensive preclinical studies to fully capture the commercialization potential of this new chemotype. In preclinical models of lymphoma and multiple myeloma (MM), these selective inhibitors have resulted in synergistic antitumor activity.

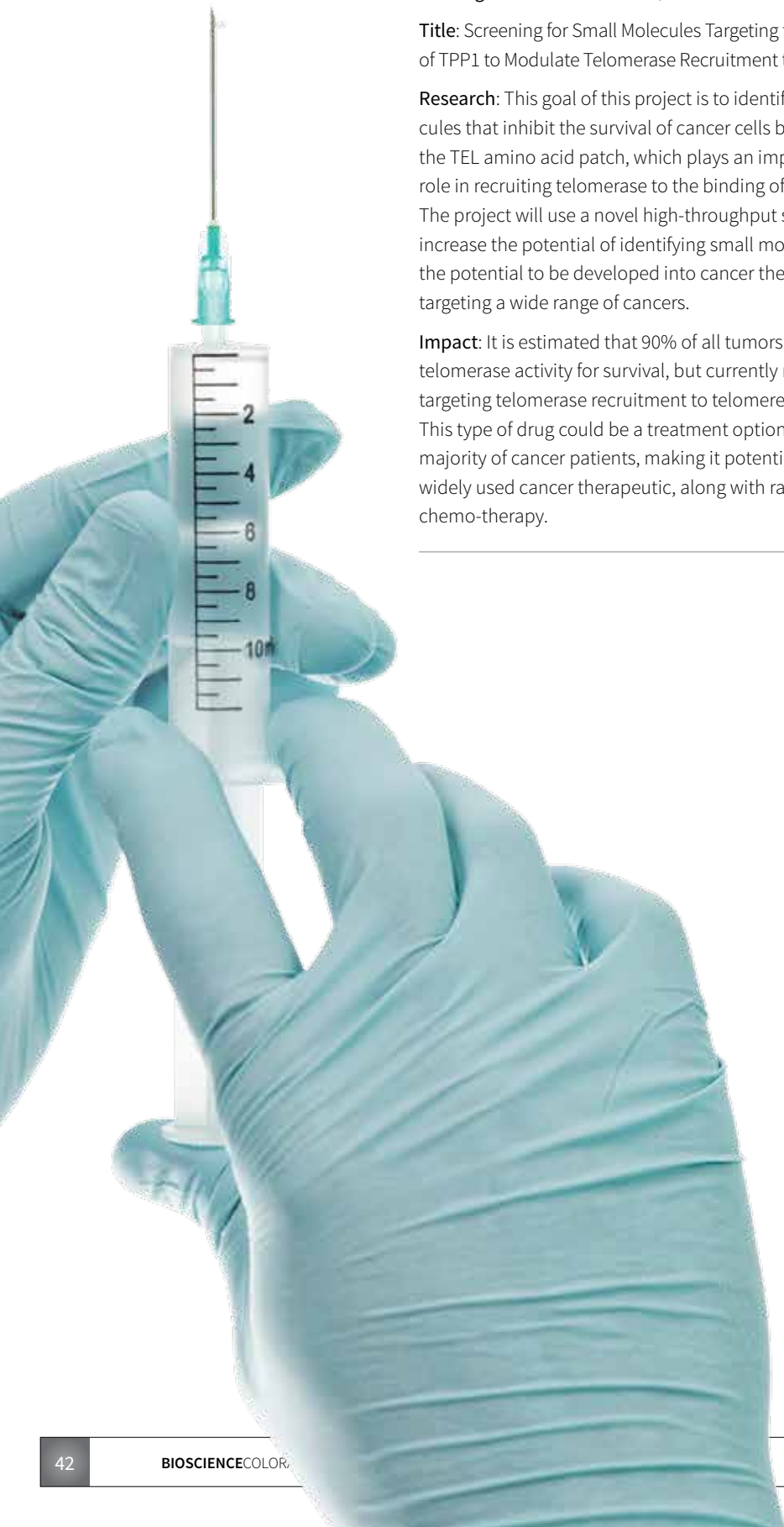
Impact: Overexpression of the enzyme HDAC6 correlates with invasive metastatic behavior of tumor cells. HDAC6 has quickly become a very promising target, with minimal side effects, for treatment of cancer, stroke, ischemia and spinal cord injuries.

Investigator: Hang Hubert Yin, Ph.D.

Title: Optimizing TLR3 Inhibitors as Potential Therapeutics for Treating Inflammatory Diseases

Research: This project aims to optimize and improve the potency of a previously identified small molecule inhibitor of TLR3/dsRNA interactions, which have been shown to contribute to morbidity and mortality in inflammatory diseases including lupus, rheumatoid arthritis, systemic sclerosis and Sjögren's syndrome.

Impact: Modulation of TLR3 pathways is a promising strategy to fight a variety of inflammatory diseases, and may also be effective against cardiovascular diseases with significant market potentials. If successful, this project would improve understanding of this key pathway, and pave the way for development of clinically-useful, TLR3-targeted therapeutics.



University of Colorado Boulder

Investigator: Xiang Wang, Ph.D.

Title: Development of Novel Resistance-Modifying Agents for the Treatment of MRSA

Research: This project will look to develop previously-identified resistance-modifying agents (RMA's) to resensitize Methicillin-resistant *S. aureus* (MRSA) to β -lactam antibiotics such as Augmentin and cefazolin. The project will identify a lead compound, and generate initial in vivo efficacy and pharmacokinetics data.

Impact: The extensive and largely unrestricted use of antibiotics has led to the development of resistance in their pathogenic bacterial targets – MRSA is currently the leading cause of healthcare-associated infections. Further development of these RMA's has the potential to extend the lifespans of current inexpensive classes of antibiotics, and to provide more effective treatment for antibiotic-resistant bacterial infections.

University of Colorado Colorado Springs

Investigator: Janusz H. Hankiewicz, Ph.D.

Title: Development of Contrast for Magnetic Resonance Imaging for Non-Invasive in vivo Temperature Measurement

Research: The aim of this project is to develop a minimally invasive, magnetic resonance thermometry that produces high thermal, spatial and temporal resolution temperature maps. These temperature maps would be superimposed on anatomical images within the targeted tissue, helpful in diagnosing and treating a variety of health problems.

Impact: By eliminating invasive, single-point temperature measurements, this new method would help to determine precise and reliable tissue temperatures, which are useful for detecting inflammation and investigating tumors in humans and animals.

University of Colorado Denver

Investigator: Daewon Park, Ph.D.

Title: Antimicrobial Reverse Thermal Gel for Surgical Coating

Research: The goal of this project is to design and test a viable alternative to plastic surgical incision drapes by using a polymer-based antimicrobial surgical coating.

The gel coating has shown significant antimicrobial activity against *S.aureus*, *E.coli*, and even the influenza virus.

Impact: This coating would help to avoid the nearly two million surgical site infections (SSIs) caused annually by surgical procedures in the U.S. Compared to traditional plastic surgical drapes, the coating is easier to apply and remove, and provides better adhesion and reduced risk of infection.



University of Colorado Anschutz Medical Campus

Investigator: Daniel V. LaBarbera, Ph.D.

Title: Marine Derived Antineoplastic Agents for the Treatment of Drug-Resistant and Invasive Cancer

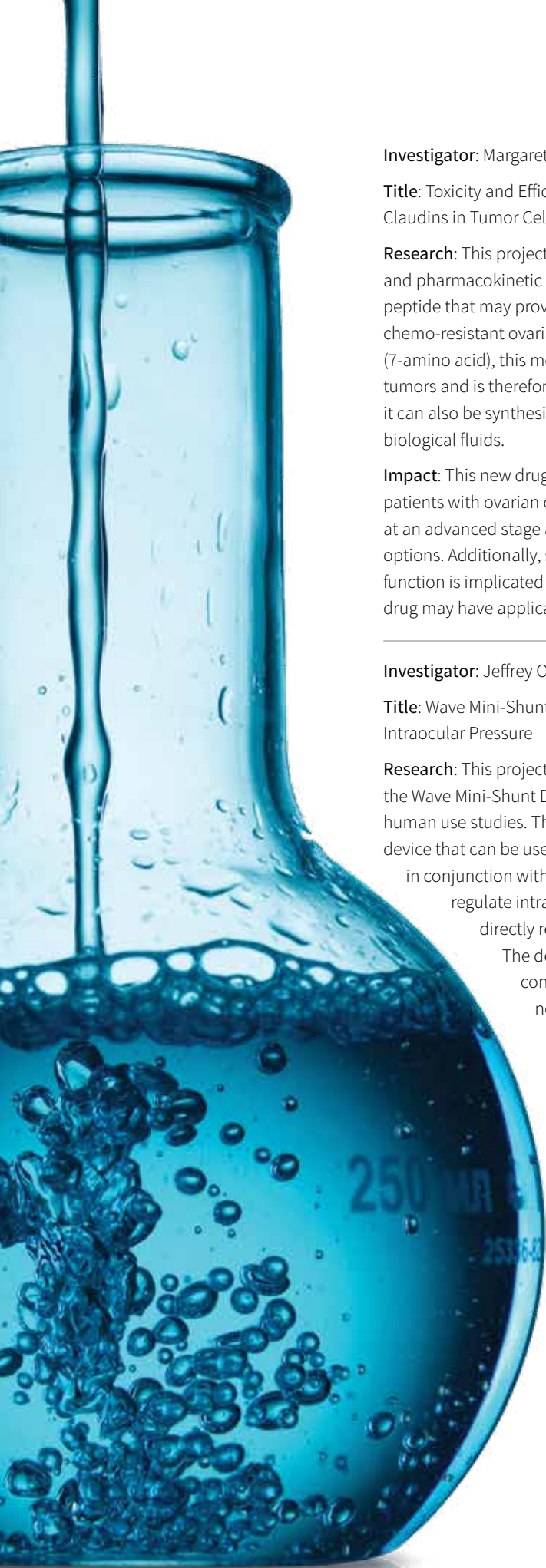
Research: This project will test the efficacy of neoamphimedine (neo), a marine alkaloid that has been shown to inhibit TopoII α , a key protein in the TCF transcription complex that promotes tumor cell invasion and metastasis. The project will characterize the compound's mechanism of action, identify key biomarkers, and evaluate combination efficacy strategies.

Impact: A drug such as neo that specifically eradicates tumor initiating cells and reduces tumor volume has the potential to be more effective than current drugs to reduce relapse and metastasis, which causes 90% of cancer deaths.

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Investigator: Margaret C. Neville, Ph.D.

Title: Toxicity and Efficacy Studies on a Peptide Targeting Claudins in Tumor Cells

Research: This project will provide initial safety, toxicity and pharmacokinetic data on a previously-identified small peptide that may provide a way to target highly mobile, chemo-resistant ovarian tumors. Because of its small size (7-amino acid), this molecule can easily penetrate solid tumors and is therefore less likely to be immunogenic; it can also be synthesized and metabolized slowly in biological fluids.

Impact: This new drug could have a significant impact on patients with ovarian cancer, who are typically diagnosed at an advanced stage and with limited treatment options. Additionally, since the targeted claudin-4 function is implicated in several other tumor types, the drug may have applications beyond ovarian cancer.

Investigator: Jeffrey Olson, M.D.

Title: Wave Mini-Shunt Laser Activated Device to Regulate Intraocular Pressure

Research: This project will test the safety and efficacy of the Wave Mini-Shunt Device in preparation for first-in-human use studies. The Wave Mini-Shunt is a versatile device that can be used as a stand-alone therapy, or in conjunction with other devices or procedures, to regulate intraocular pressure (IOP), which is directly related to progression of glaucoma. The device allows post-operative control of intraocular pressure with a non-invasive laser procedure using a nanofilm regulator, and has been extensively tested in vitro.

Impact: Current standards of treating the blinding complications of glaucoma revolve around topical medicines, laser treatments, and surgery for more advanced cases; however, current surgeries have a very high failure rate for at-risk patients and cannot be customized to the individual patient.

Investigator: David H. Wagner, Ph.D.

Title: Testing a Drug in EAE as a Potential Treatment for Multiple Sclerosis

Research: This project will provide key toxicology and other preclinical data for a previously-identified small peptide that specifically inhibits a T cell subset (Th40 cells) that is responsible for the majority of autoimmune inflammation. In particular, this projects looks to create a clinical pathway for the use of this peptide to treat multiple sclerosis (MS).

Impact: Currently, only two of 10 FDA-approved MS drugs directly target the autoimmune components of MS, and none have greatly impacted the course of MS by preventing relapses of disease. By specifically targeting Th40 cells, this therapy has the potential to control autoimmune inflammation and reverse the inflammatory effects leading to organ damage in MS, as well as in other autoimmune diseases like type-1 diabetes (T1D).



UNIVERSITY of
DENVER

Investigator: Siavash Pourkamali Anaraki, Ph.D.

Title: Development of a Nanomechanical Biosensing Platform

Research: A variety of disk-shaped micro-resonators with different dimensions and different topologies were designed, fabricated, characterized and optimized. A microfluidic packaging technique was also developed that allows encapsulation of devices inside microfluidic channels. This protects the devices from direct exposure to the outside environment and therefore protects them against contaminants, particulates and other potential causes of damage to the devices. Using the microfluidic channels, small biofluidic samples can be injected into the channels coming effectively in contact with the resonator surface without having to use large sample volumes.

Impact: Some of the results produced under this effort have helped the PI in founding FemtoScale, Inc., in Denver, Colorado, that currently employs 4 full-time employees in Colorado with aggressive growth expected over the next few years. FemtoScale is mainly targeting development of a number MEMS resonator-based sensor products. This includes biomolecular sensors, industrial moisture sensors, particulate detectors/counters and gas sensors.

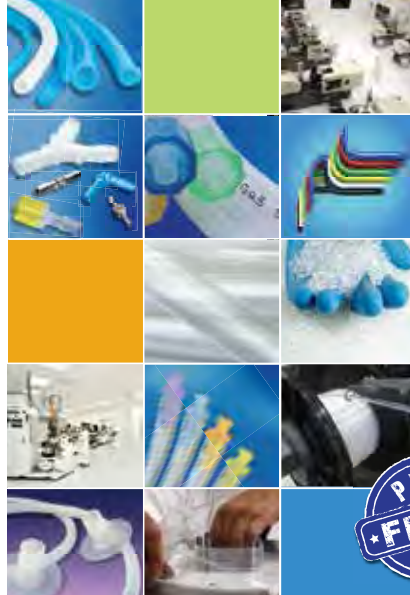


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Early Stage Capital and Retention Grants 2013 - 2014

Early-Stage grants provide needed funding to companies commercializing technologies from Colorado research institutions by backing research, testing, and business development activities that will prepare them for additional third-party financing.

Bioscience Discovery Evaluation Grant Program (BDEGP)

BaroFold, Inc – Aurora

www.barofold.com

Pressure Enabled Protein Manufacturing (PreEMT™) technology to improve the tolerability, efficacy and safety of a wide variety of protein therapeutics

Entero Track - Centennial

Next generation monitoring of gastrointestinal allergic diseases

SixOne Solutions – Aurora

www.sixonesolutions.com

Targeted therapeutic for breast cancer that may also be effective in treating other cancers, through small molecule inhibitors of the Six1/Eya complex

SmartMove – Fort Collins

www.getsmartmove.com

Personal physical activity coaching solutions that make it easy to develop daily healthy activity habits. Fighting “sitting disease” study

Tissue Fusion – Colorado Springs

www.tissuefusion.com

Laser-based medical devices to fuse biological tissue together as an alternative to sutures or staples

Xalud Therapeutics, Inc. – Boulder

www.xaludthera.com

Novel therapies for the treatment of neuro-inflammatory diseases and inflammatory joint disorders

Advanced Industry Accelerator Grant Program (AI)

Fitbionic, Inc. - Idaho Springs

www.fitbionic.com

Prosthetic foot product with cloud-based dashboard

dbMEDx – Littleton

www.dbmedx.com

Automated bladder volume measurement device—an essential component of a comprehensive CAUTI (catheter associated urinary tract infection) prevention program

Membrane Protective Technologies Inc.

(MPTI) - Fort Collins

www.membrane-protect.com

Blend of organic plant extracts which improves artificial insemination pregnancy rates in cows

VetDC, Inc – Fort Collins

www.vet-dc.com

Veterinary biopharmaceutical company, targeting breakthrough, anti-cancer therapies for companion animals



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Commercialization Infrastructure Grants

Commercialization Infrastructure grants support joint efforts of industry and academia to create resources that are essential for industry growth. BDEGP Commercialization Infrastructure funds have funded four organizations over a number of years. Grantees identify and manage technologies, and support collaboration to bring necessary expertise together to advance novel Colorado biotechnologies to commercialization.

BIOSCIENCE DISCOVERY EVALUATION GRANT PROGRAM (BDEGP)

The Colorado Center for Drug Discovery (C2D2)

www.c2d2.org

Based at Colorado State University, C2D2 is a resource to faculty at all Colorado research universities, bringing biology and chemistry faculty together to use chemical libraries, computational resources, bioinformatics, cheminformatics, database support, virtual high throughput screening, and Computer Aided Drug Design to pharmacologically validate drug candidates with patent-protected chemical matter and innovative therapeutics for unmet medical needs.

The Colorado Institute for Drug, Device and Diagnostic Development (CID4)

cid4.com

CID4 works to identify, fund and actively manage emerging life science technologies from Colorado research institutions, Colorado start-ups and early-stage businesses with the goal of creating bioscience jobs in Colorado. Grant funds support operations of the CID4, as well as the development and management of life-science discoveries under their portfolio. The CID4 has 8 companies under its guidance supporting their operational development and attracting additional investment to meet their needs.

The BioFrontiers Institute

biofrontiers.colorado.edu

A state-of-the art research and education facility that links the basic sciences, engineering, clinical practice and industry at the University of Colorado's Boulder campus

to support breakthrough developments in areas such as engineering human tissues, RNA enzyme and aptamer based pharmaceutical, biorefining and genetics. Grant funds support equipment, resources, and personnel costs to develop the core facilities of the institute.

The University of Colorado, Skagg's School of Pharmacy at Anschutz

www.ucdenver.edu/academics/colleges/pharmacy/Research/Pages/Research.aspx

Developed an HTS/HCS (high throughput/content screening) Core Facility for drug discovery. This resources has been utilized by more than 100 researchers and companies advancing the science and helping to secure intellectual property.

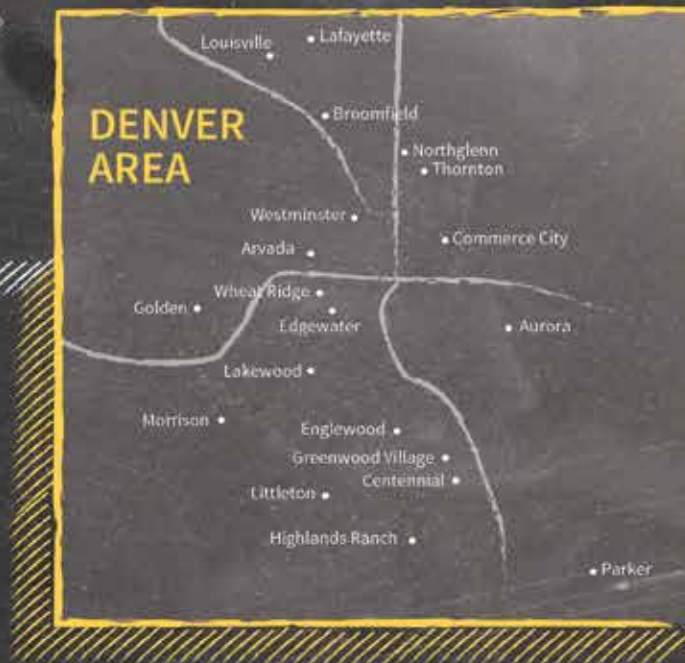


DIRECTORY



INDEX

- 49 Medical Device, Diagnostic and Related Companies
- 59 Biotechnology, Pharmaceutical and Related Companies
- 67 Biofuels and Related Companies
- 68 Research and Education Institutions
- 71 Member Foundations
- 72 Member Service Providers



MEDICAL DEVICE, DIAGNOSTIC AND RELATED COMPANIES

2C Technologies

Denver

www.2ctechcorp.com

Development, validation, and commercialization of "SeeQ" intraocular implant as a next generation in vivo system for stimulating degenerated retinal cells and restoring vision.

Abilities Unlimited

Colorado Springs, Denver

www.auiop.com

Provides artificial limbs and custom orthopedic appliances.

AbleLink Technologies

Colorado Springs

www.ablelinktech.com

Addresses the need for well-researched cognitive support technologies for individuals with intellectual disabilities.

Able Planet

Wheat Ridge

www.ableplanet.com

Developing an extensive line of audio and communications products that are usable by people with all levels of hearing, and provide a means whereby users can listen at lower volumes without compromising full rich sound.

Accu-Tube Corporation

Englewood

www.accutube.com

Manufactures standard and custom size stainless steel hypodermic medical tubing.

C Acertara Acoustic Laboratories, LLC

Longmont

www.acertaralabs.com

Independent ISO/IEC accredited medical ultrasound acoustic measurement and testing laboratory.

Actall Security Products

Denver

www.actallsp.com

Engineers, manufactures and markets wireless systems for hospital and pharmaceutical company facilities.

Actium Biosystems

Boulder

www.actiumbio.com

Developing new technology to treat cancer through the use nanoparticles to weaken and destroy cancer cells.

Advanced MicroLabs, LLC

Fort Collins

www.advancedmicrolabs.com

Researches and develops chemical analytical instruments in 'Lab-on-a-chip' format.

Advanced Research Instruments Corporation

Golden

www.aricorp.com

Produces preamplifiers for PMT's and electron multipliers, high voltage power supplies, counters and timers, precision rate meters, and image analyzers for scanning electron microscopes.

Aesthetic Technologies

Golden

www.parisianpeel.com

Manufactures and sells Parisian Peel® brand microdermabrasion systems and accessories along with skin care products to medical, and spa professionals.

Aestis, Inc.

Boulder

www.altitudetraining.com/aux/about/aestis

Develops a treatment for obesity through controlled hypoxia technology. The two principal components are the air separation unit and proprietary control system.

Agilent Technologies

Englewood

www.agilent.com

Provides core electronic and bio-analytical measurement tools to advance life science research.

AktiVax

Boulder, Aurora

www.aktivax.com

Developing novel reconstitution, safety syringes for vaccines and biologics.

C Allison Medical, Inc.

Littleton

www.allisonmedical.com

Develops products to assist specialists in the medical and veterinary industries, and have designed and provided essential syringes, needles and custom items for various industries.

C AlloSource

Centennial

www.allosource.org

Develops, processes and distributes life-enhancing bone and tissue allografts to the medical community.

AllPro

Broomfield

www.allprodenal.com

Produces a large selection of non-latex proph cups, proph angles and other dental products.

Alpha Mold West

Broomfield

www.alphamoldwest.com

Plastic injection mold-making facility for the medical industry.

Angioslide, Inc.

Wheat Ridge

www.angioslide.com

Privately held medical device company that developed a unique Embolic Capture Angioplasty solution, PROTEUS™, which provides a combination of PTA balloon and embolic capture.

Animark, Inc.

Aurora

www.animark.us

Manufactures and sells ultrasound pregnancy detectors and ovulation predictors for livestock breeding.

C Apdyne Medical Company

Denver

www.apdyne.com

Manufactures and distributes the Apdyne Phenol Applicator Kit used to anesthetize the tympanic membrane during in-office myringotomy procedures.

Aqueous Biomedical

Colorado Springs

www.aqueousbio.com

Develops biocompatible materials and geometric designs that can be applied to stents, shunts, artificial organs and drug delivery devices. Their first product, the Oculieve™ shunt, is designed to control over-pressurization inside the eye caused by glaucoma.

C = CBSA Member

C ArcScan, Inc.

Morrison

www.arcscan.com

Early stage med device startup developing VHF Ultrasound for comprehensive ophthalmic imaging.

Arcturus Star Products, LLP

Cortez

www.lymphstarpro.com

Pioneering Vibrational Energy Therapy for the wellness and beauty professions. Vibrational energies incorporate subtle low frequencies of light, sound, and electrical waves. Their therapeutic specialty is in the area of lymphatic health.

ASI Medical, Inc.

Centennial

www.asimedical.net

Developer of specialized mobile and integrated dental carts, as well as unique dental instruments for the modern dental office.

C Aspire Biotech, Inc.

Colorado Springs

www.aspirebiotech.com

Provides contract services for all phases of product development from concept to launch, and produces its own skin sealant and wound-closure adhesives.

Auri-Stim Medical

Denver

www.net1device.com

Offers an alternative therapy for migraine headaches, hormonal migraine, chronic headaches, premenstrual syndrome (PMS), nicotine and narcotics addictions using the NET-1000 device.

Avantes

Broomfield

www.avantes.com

Produces, develops and sells spectrometers, light sources, fiber optic multiplexer, fiber optic cables, software, fiber optics, accessories to the medical device industry.

Bal Seal Engineering, Inc.

Colorado Springs

www.balseal.com

Produces seals and canted-coil springs for sealing, holding, latching, and electrical contact in a variety of applications throughout the medical market.

Baxter Healthcare Corporation

Englewood

www.baxter.com

Baxter International, through its subsidiaries, develops, manufactures and markets products that save and sustain the lives of people with hemophilia, immune disorders, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions.

C Beacon Biotechnology

Aurora

www.beaconbiotechnology.com

BrightSPOT Reader detection platform and luciferase-based diagnostic assays combine cutting-edge hardware and novel biology in a way that is both powerful and simple.

Beckman Coulter

Fort Collins

www.beckmancoulter.com

Develops and produces instruments for the diagnostic industry. Specializes in the fields of immunocytochemistry, flow cytometry, and microbiology.

Bell Dental Products, LLC

Englewood

www.belldental.com

Designs, develops, and manufactures precision dental equipment based on electric motor technology.

BiO₂ Medical, Inc.

Golden

www.bio2medical.com

Medical device manufacturer founded to design, develop, and subsequently manufacture a range of medical products in response to clinical needs.

BioCare Systems, Inc.

Parker

www.biocaresystems.com

Designs, develops and markets patent-protected, FDA cleared, new health-care devices (LumiWave™) that use deep-tissue light therapy to decrease pain, accelerate healing and improve quality of life.

C Bioradix, Inc.

Aurora, Boulder

www.bioradix.com

Molecular diagnostics company advancing the revolution in personalized medicine by providing physicians timely and clinically useful information.

Bio-Logistics Preclinical, Inc.

Pierce

Offers engineering and regulatory support and preclinical strategic development to the medical device industry.

C BiOptix

Boulder

www.bioptixinc.com

Offers a new, patented approach to label-free analysis, called Surface Plasmon Enhanced interferometry (SPE).

Biotricity Medical, Inc.

Aurora

www.biotricitymedical.com

Research and manufacturing company specializing in developing long-term power requirements for implanted devices based on bioelectric generation.

BioFusionary Corporation

Wheat Ridge

www.biofusionary.com

Designs and develops medical devices and biomaterials that shape, tighten and seal tissues

BioVision Technologies, Inc.

Golden

www.biovisiontech.com

Develops and manufactures micro-visualization solutions that enable endoluminal and minimally invasive medical procedures in both human and veterinary medicine. The imaging technologies and customized micro-endoscope solutions are integrated to reduce incision size and speed healing.

C BodySync, Inc.

Aurora

www.bodysync.com

Applies evidence-based genetic information to develop personalized products that help individuals achieve their health goals.

Boulder Diagnostics

Boulder

www.boulderdiagnostics.com

Boulder Diagnostics is a specialty diagnostics company dedicated to developing diagnostic reagents and test for infectious diseases and other protein targets that can benefit from a reliable, easy to use test for laboratory, physician's office or home use. We focus on under-served markets where the current state of the art is inadequate for effective diagnosis.

Boulder Innovation Group, Inc.

Boulder

www.boulderinnovators.com

Develops and manufactures image-guided surgical navigation digitizers and industrial 3D capture and modeling equipment.

Broadwest Corporation

Denver

www.broadwest.com

Develops and manufactures ergonomic mammography viewing equipment.

C5 Medical Werks

Grand Junction

www.c5medicalwerks.com

Offers ceramic manufacturing, materials expertise, and custom engineering support to prototype and commercialize designs and patents to orthopedic companies for hip, spinal and dental implants.

Canberra Industries

Arvada

www.canberra.com

Manufactures and supplies analytical instruments, systems and services for radiation detection and radiation monitoring.

Car-May, LLC

Berthoud

www.car-may.com

Unlike basic metering pumps, Car-May's systems provide pumping capability, fluid measurement, and flow control all in one compact module.

Care Electronics, Inc.

Broomfield

www.medicalshoponline.com

Offers a range of electronic monitoring and alarm equipment for the home health and long term care markets.

C Cascade TEK

Longmont

www.cascadetek.com

Medical device testing laboratory located specializing in package testing, accelerated aging, photostability, UV, temperature/humidity, vibration, shock testing services.

C CEA Medical Manufacturing

Colorado Springs

www.ceamedicalmanufacturing.com

Provides product development and complete product assembly and packaging services to the medical industry.

C CeraPedics, Inc.

Westminster

www.cerapedics.com

Developing and commercializing novel osteobiologic products based on a proprietary small peptide technology, P-15™ on an inorganic bone mineral (ABM).

C CereScan

Denver

www.cerescanimaging.com

Specialize in state of the art functional brain imaging utilizing a proprietary process including the latest generation high resolution gamma camera, the industry's leading brain image reconstruction software, specially trained board-certified physicians and research-based knowledge to provide unparalleled diagnostic medical reports.

Clean Room Devices, LLC

Westminster

www.cleanroomdevices.com

Manufactures products that are engineered specifically for "clean room" environments.

Cochlear Americas

Centennial

www.cochlearamericas.com

Global leader in implantable hearing solutions. Manufacturer of Nucleus cochlear implants and the Baha programmable bone conduction system.

Colibri Heart Valve

Broomfield

www.colibrihv.com

Researches and develops novel heart valve technologies.

Colorado Laser Technologies, Inc.

Colorado Springs

www.coloradolasermarking.com

Provides YAG laser engraving technology, as well as CO2 and YAG laser cutting services.

Colorado Precision Products, Inc.

Boulder

www.coloradoprecision.com

Provides diamond turned and polished optics/parts. Fabricator of X-ray telescope optical components. Produces and offers air bearing LVDT contact linear measurement systems, .05 microinch resolution.

COMEG U.S.A. Endoscopy, Inc.

Denver

www.sopro-comeg.com

A product range producing high quality video imagery that meets the needs of the surgeons in terms of products, budget and services, whatever their specialty.

Confi-Dental Products Company

Louisville

www.confidental.com

Manufacture a wide range of dental and healthcare products including composites, cements, creams, lotions & ointments.

CONMED Electrosurgery

Centennial

www.conmed.com

Designs and manufactures RF electrosurgical generators and accessories of the highest quality, safety and value for use in surgical procedures performed in virtually every hospital, surgery center and physicians office.

CoorsTek

Golden

www.coorstek.com

Custom engineering, materials expertise, operational excellence, and rapid execution.

Corgenix Medical Corporation

Broomfield

www.corgenix.com

The Colorado facility is engaged in research, development, manufacture, and marketing of in vitro diagnostic products for use in disease detection and prevention.

C Covidien

Boulder

www.covidien.com

Offers an extensive product line, including pulse oximetry and airway and temperature management devices, ventilators, vessel sealing, and electrosurgery equipment.

C Crosstrees Medical, Inc.

Boulder

www.crosstreesmedical.com

Privately-held company developing advanced devices and instruments for the treatment of vertebral body compression fractures (VCF) in the spine.

C = CBSA Member

Chart Industries, Inc.

Denver

www.chartindustries.com

Manufacturing services to companies who want to out-source some or all of their manufacturing processes, and to companies that have capacity issues with their current manufacturing resources.

C. R. Bard, Inc./ Medivance

Louisville

www.medivance.com

Leading multinational developer, manufacturer and marketer of innovative, life-enhancing medical technologies in the fields of vascular, urology, oncology and surgical specialty products.

CytoLogic, Inc.

Boulder

Commercialization of an immunotherapy device for treatment of cancer.

Darkhorse Technologies

Nederland

bparks@colorado.edu

Commercializes a patented technology for affordable, hand-carried, battery operated instruments for on-site genetic detection using Polymerase Chain Reaction (PCR).

DataWave Technologies Corporation

Loveland

www.dwavetech.com

Manufactures a wireless and battery-free device for acquiring and transmitting data from electrodes and other biosensors to a receiver placed meters away for electrophysiology, neurophysiology and physiology related research on both humans and large animals.

C dBMEDx

Littleton

www.dbmedx.com

Developing next-generation, automated, wireless 3D ultrasound devices based upon our patent-pending full-view architecture.

DCS Surgical

Boulder

www.mercuryfund.com/dcs-surgical/

Early stage company formed to evaluate potential new surgical procedures for the treatment of sinusitis.

C DePuy Synthes, Companies of Johnson & Johnson

Monument

www.synthes.com

Develops, produces and markets instruments, implants and biomaterials for the surgical fixation, correction and regeneration of the human skeleton and its soft tissues. Depuy Synthes is a wholly owned subsidiary of the Johnson & Johnson Company.

Denver Optic Company

Englewood

www.eyeprosthesis.com

Specializes in the fitting and fabrication of two types of ocular prosthesis.

Desert Glass Works

Colorado Springs

www.dgw.com

Manufactures quartzware for the medical and research industries.

Diazamed

Fort Collins

www.diazamed.com

Development of advanced materials and utilize leading technologies to create more biocompatible surfaces.

Die Cut Technologies

Northglenn

www.diecuttech.com

Offers precision material conversion, skilled assembly and manufacturing efficiencies, including cleanroom facilities.

Directed Energy Solutions

Colorado Springs

www.denergysolutions.com

Develops advanced laser and optical device solutions for medical applications.

DNTLworks Equipment Corporation

Centennial

www.dntlworks.com

Manufactures portable, mobile and self-contained dental systems.

Double Helix

Boulder

Emerging startup that commercializes computational optical-digital imaging technologies used in range estimation, super-resolution, and 3D imaging biomedical imaging.

dpiX, Inc.

Colorado Springs

www.dpix.com

Produces high-resolution amorphous silicon (a-Si) sensor arrays for medical X-ray imaging.

C E.I. Medical Imaging

Loveland

www.eimedical.com

Manufacturer of highly portable and ruggedized ultrasound devices for the veterinary industry.

Eido

Broomfield

Anatomic localization medical device developer in patent pending stage.

C EJ BioMed – A Division of Eldon James Corporation

Denver

www.EJBioMed.com

Manufactures, assembles and packages PVC Free tubing and connectors in a single cleanroom environment. Custom design and product development available. ISO 13485:2003, ISO 9001:2008, and ISO/TS 16949:2009 certified

Electronic Materials, Inc. (EMI)

Breckenridge

www.emiuv.com

Offers a complete line of EMCAST UV adhesives, epoxies, sealants, encapsulants and coatings, EMI also offers room temperature, thermal and Visible light cure adhesive systems.

Ellab, Inc.

Centennial

www.ellab.com

Manufactures thermal validation solutions for food and pharmaceutical industries.

Empirical Testing Corporation

Colorado Springs

www.empiricaltesting.com

Provides medical device testing services that add value throughout the product development cycle, with a focus on spinal implant device testing.

Encision, Inc.

Boulder

www.encision.com

Designs and manufactures innovative surgical devices. Developed AEM® Laparoscopic Instruments to improve electrosurgery and reduce the chance for patient injury in minimally invasive surgery.

C EndoShape, Inc.

Boulder, Aurora

www.endoshape.com

Manufactures surgical and medical instruments focusing on shape memory polymer devices for endoluminal application.

es2 technologies, Inc.

Englewood

www.es2technologies.com

Developing proprietary devices and contract design.

C Evergreen Research, Inc.

Golden

www.evergreenresearch.com

Offers a complete range of development services from product definition and feasibility studies through detailed design to pilot-run and low-volume production to the medical device industry.

Eveia Medical

Boulder

www.eveiamedical.com

Developing two proprietary testing platforms.

Extreme Diagnostics

Boulder

www.extremediagnosics.com

Develops noninvasive measurement systems, including optical systems such as custom holographic and interferometric instruments. Specializes in structural health monitoring, nondestructive testing, and materials processing.

Falcon Rehabilitation Products

Denver

www.falconrehab.net/products/

Designs and builds high quality, innovative quadriplegic seating systems and accessories (Falcon Rehabilitation Products, LaBac Seating Systems, Gel Ovarions).

Firefly Medical, Inc.

Fort Collins

www.fireflymedicalinc.com

Designs and develops innovative durable medical equipment for clinical healthcare markets.

Fischer Medical Technologies, Inc.

Broomfield

www.fischermti.com

Designs, manufactures, and markets imaging systems for the screening and diagnosis of breast cancer.

FitBionic

Boulder

www.fitbionic.com

Creating groundbreaking experiences for amputees and prosthetics based on organic design.

C FlashBack Technologies

Longmont

www.flashbacktechnologies.com

Fast, non-invasive detection of acute blood loss volume and prediction of cardiovascular collapse in emergency situations.

Fluonic

Boulder

www.fluonic.com

Develops infusion therapy systems with disposable sensors for OEM and proprietary pumping systems.

C Futura Surgical, Inc.

Wheat Ridge

www.futurasurgical.com

Development, manufacture and sales of orthopedic products

GE Analytical Instruments

Boulder

www.geinstruments.com

Manufactures instruments used to measure total organic carbon (TOC) in water for pharmaceutical applications and medical research.

Genesee BioMedical, Inc.

Denver

www.geneseebiomedical.com

Manufactures cardiac surgery instruments and devices.

Gnathodontics, Ltd.

Lakewood

www.gnatho.com

Specializes in functional dentistry, advanced implant work, precision partial dentures, combination cases and metal-free fixed restorations.

C Grant Dental Technology Corporation

Colorado Springs

www.grantdentaltech.com

Dental implants and surgical/restorative tools.

C Groesanoak Product Development, Inc.

Frederick

www.groesanoak.com

Creates innovative proprietary new medical devices focusing on areas of injury management, neonatal care and performance monitoring.

Hach Company

Loveland

www.hach.com

Manufactures and distributes analytical instruments and reagents used to test the quality of water and other aqueous solutions.

C Health Diagnostic Laboratory, Inc.

Richmond VA

www.hdlabinc.com

Offers a comprehensive test menu of risk factors and biomarkers for cardiovascular and related diseases.

HEI Advanced Medical Operations

Boulder

www.heii.com

Develops and manufactures high performance components, medical software, medical devices, and non-medical products. Produces microcircuits and subsystems for hearing and medical applications.

Hirsh Precision Products, Inc.

Boulder

www.hppi.com

Manufactures precision-machined and assembled components for the medical industry.

Hyperion Labs, LLC

Fort Collins

Plasma-based modifications including: self organized patterning or texturization, physical thin film deposition, plasma enhanced chemical vapor deposition, and ion implantation.

Illumasonix, LLC

Aurora

www.alliedminds.com/subsidiaries/ilumasonix

In partnership with Allied Minds, we will develop and commercialize a new non-invasive vascular disease detection procedure which will provide near real-time assessment of detailed blood flow patterns within the cardiovascular system.

C = CBSA Member

C InDevR, Inc.

Boulder

www.indevr.com

Develops and manufactures biomedical instruments including molecular diagnostic assays, virus measurement systems and detection technologies for micro-arrays.

Infinity Photo-Optical Company

Boulder

www.infinity-usa.com

Manufactures long-distance and continuously-focusable microscope technology, macro systems, internal-focusing devices and other lenses.

Instec, Inc.

Boulder

www.instec.com

Manufactures precision temperature controllers and microscope hot stage systems for temperature cycling, food sciences, materials characterization, forensics, polymers and liquid crystals and microbiology.

Intelligent Imaging Innovations (3i)

Denver

www.intelligent-imaging.com

Design and builds systems around the newest automated fluorescence microscopes and the most advanced peripheral devices.

Jorgensen Laboratories, Inc.

Loveland

www.jorvet.com

Designs and manufactures instruments which are used in the animal health field including specialty instruments, surgical suture, and veterinary equipment.

Jortek Surgical, Inc.

Boulder

www.jortek.com

Develops innovative orthopedic devices with a focus on joint and tissue preservation and augmentation.

JustRight Surgical

Boulder

www.justrightsurgical.com

Developing precisely designed surgical instruments that allow access to confined spaces and often delicate structures.

Kindara

Boulder

www.kindara.com

Women's health company that makes a leading fertility tracking app for iPhone.

C Kestrel Labs, Inc.

Boulder

www.kestellabs.com

Kestrel Labs combines internal research and development projects with consulting and contract development of innovative, patient monitoring concepts and other medical technologies.

Kurz Medical

Aurora

www.kurzmed.com

Manufactures and sells ENT devices worldwide. We are in particular focused on passive middle ear implants/prosthesis for ossiculoplasty in titanium and nitinol.

Lanx, LLC/Biomet, Inc.

Broomfield

www.lanx.com

Specializes in systems and implants for all segments of spinal surgery. Integrating leading technology, intellectual property and state-of-the-art engineering, each product is designed to simplify surgery and improve the quality of care for patients worldwide by providing surgeons with innovative spinal products.

Leap Frogg, LLC

Grand Junction

Dynamic compression system which reduces nursing time and is more comfortable.

Leeds Precision Instruments, Inc.

Denver

www.leedsmicro.com

Offers microscopes and custom-engineered products ranging from small modifications on a microscope stand that accommodate specific applications, to large specialized systems, such as an optical comparison bridge for forensic science.

Lenox MacLaren Surgical Instruments

Louisville

www.lenoxmaclaren.com

Manufactures precision orthopedic and neurological surgical instruments.

Logisens Corporation

Fort Collins

www.logisens.com

Develops biosensor and software technology, enabling a significant breakthrough in real-time measurement and reduction of stress.

C Luoxis

Greenwood Village

www.luoxis.com

In-vitro diagnostics company focused on the development and global commercialization of RedoxSYS™.

Magnelab, Inc.

Longmont

www.magnelab.com

Manufactures custom magnetic components (transformers/inductors) for the medical field.

Mayer Medical Technologies, Inc.

Grand Junction

www.mayermedical.com

Mayer Medical Technologies, Inc. improves health and saves lives by innovating new products, providing seed capital to medical start-ups, and assisting medical professionals in developing their product ideas.

C mBio Diagnostics

Boulder

www.mbiody.com

Develops a low-cost, high sensitivity, multi-pathogen detection system for diagnostics.

Medical Modeling, Inc.

Golden

www.medicalmodeling.com

Produces highly accurate 3-D physical models of human bone structure from imaging such as CT or MRI.

C Medtronic Navigation, Inc.

Louisville

www.medtronic.com

At the forefront of surgical navigation solutions, guiding the industry to a higher standard of care for several clinical specialties, including cranial neurosurgery, functional neurosurgery, spinal, ENT, joint replacement and orthopaedic trauma surgeries.

Mesa Laboratories, Inc.

Lakewood

www.mesalabs.com

Provides dialysis meters and related supplies to dialysis clinics world wide.

Metamatrix, LLC

Boulder

www.zorbent.com

Manufacturers of ZORBENT which absorbent is designed to leave no residue, reducing the risk associated with slippery surfaces and is completely safe to use and represents no health hazard.

Micro Imaging Solutions, LLC (MIS)

Denver

www.micro-imaging.us

Developed an innovative-patented technology that can be utilized in the manufacture of micro-digital CMOS cameras.

Microlife Medical Home Solutions, Inc.

Golden

www.mimhs.com

Proprietary hand-held medical devices and systemic solutions offer healthcare providers evidence-based and practice-tested methods for accurate assessment, diagnosis, and treatment of cardiovascular and metabolic diseases.

Mikron Corporation

Aurora

www.mikron.com

Supplies transfer machining systems for complex parts, cutting tools with high performance standards, self medication and diagnostic devices.

Mind Studios

Colorado Springs

www.mind-studios.com

A full service product design and research studio housed within the University of Colorado at Colorado Springs. Offers concept generation, advanced prototyping, engineering and consumer research, human factors design and manufacturing solutions.

Montview Biomedical Design, Inc. (MBD, Inc.)

Aurora

www.montviewbiomed.com

Designs, develops and creates engineering solutions for the biomedical industry.

C MuscleSound, LLC

Denver

www.musclesound.com

Developed a process to measure muscle glycogen content real time using non-invasive ultrasound technology.

nSpire Health, Inc.

Longmont

www.nspirehealth.com

Develops, manufactures and markets respiratory care products and services focused on cardiopulmonary diagnostics, respiratory core lab services, and disease management solutions.

NEBA Health, LLC

Boulder

www.nebahealth.com

Develops neuropsychiatric medical devices, such as Neba™ an experimental, small format EEG-based device being studied under an Investigational Device Exemption from the Food and Drug Administration.

C Neuro Assessment Systems

Denver

www.neuroassessments.com

Provides an objective brain-based measure of neurocognitive symptoms associated with a wide range of brain health issues including concussion and Alzheimer's disease.

C Neuromonics, Inc.

Westminster

www.neuromonics.com

Manufacturers and distributes clinically proven devices to treat tinnitus. The Sanctuary provides situational relief for those suffering from mild to moderate tinnitus.

C Optibrand Ltd., LLC

Fort Collins

www.optibrand.com

Developed optical imaging system for veterinary diagnostics.

C OptiEnz Sensors

Fort Collins

www.optienzsensors.com

Revolutionizing measurement capabilities for organic chemical concentration; now providing continuous, real-time, in-place sensor solutions.

C Osypka Medtec, Inc.

Longmont

www.osypka-medtec.com

Manufactures medical devices.

Otologics, LLC

Boulder

Develops and commercializes surgically implantable alternatives to conventional "in the ear" hearing aids.

Oval Window Audio

Nederland

www.ovalwindowaudio.com

Produces induction loop assistive listening systems and visual and vibrotactile technologies that help deaf and hard of hearing individuals.

C Paré Surgical, Inc.

Centennial

www.paresurgical.com

Develops surgical instruments such as the Quik-Stitch endoscopic suturing system.

Parker Medical

Highlands Ranch

www.parkermedical.com

Provides airway management products that make intubation safer for the patient and easier for the medical professional.

PCC/Advanced Forming Technology

Longmont

www.pcc-aft.com

Offers thixoforming and metal injection molding for the medical device industry.

Peak Robotics, Inc.

Colorado Springs

www.peakrobotics.com

Manufactures robots, special equipment, and turnkey automated systems for a variety of industries including: biotech, electronics, medical, semiconductor, etc.

Peddle Master, Inc.

Johnstown

www.peddlemaster.com

Designs and manufactures handicapped driving aids. The Peddel Master is totally portable and can be installed and removed in a matter of seconds.

Pernicka Corporation

Fort Collins

www.pernicka.com

Offers analytical testing that meets or exceeds the requirements of MIL-STD 750/883 method 1018 and 45662A for companies in the semiconductor, aerospace, basic & applied research, surface analysis, thin film deposition, laser technology, and medical products industries.

C PharmaJet, Inc.

Golden

www.pharmajet.com

Develops a needle-free technology that has a low cost, single use, disposable polypropylene vial or cartridge, suitable for the delivery of common vaccines and standard dose injectable liquid medicines.

C = CBSA Member

C Phase Three Product Development

Fort Collins

www.phasethreedev.com

Technology and product development of microfluidics based devices and systems.

Porta-Lung, Inc.

Lakewood

www.portalung.com

Provides non-invasive ventilator support for long-term patients who need more portability.

Precision Biopsy

Aurora

In partnership with Allied Minds, developing technology for the accurate diagnosis of prostate cancer which uses advanced spectroscopy imaging techniques in combination with tissue biopsy.

Precision Diagnostic Instruments

Westminster

www.pdimeters.com

Designs and manufactures professional quality, affordable test equipment.

Precision Glassblowing

Centennial

www.precisionglassblowing.com

Provides custom and OEM scientific glass for custom synthesis, pharmaceutical, environmental, petrochemical, research, commercial, government and medical laboratories.

Preferred Medical Products, Inc.

Englewood

www.preferredmedicalproducts.com

Manufactures stainless steel medical components for hypodermic needles and lancet type products.

Prescott's, Inc.

Monument

www.surgicalmicroscopes.com

Provides reconditioned operating microscopes and allied accessories that function as intended by the original equipment manufacturer.

Prima-Temp, Inc.

Boulder

www.prima-temp.com

Innovative biometric approaches to early disease detection and reproductive medicine through the application of 21st century thermometry.

Products Group International, Inc.

Lyons

www.productsgroup.com

Researches, develops and engineers ultrasound medical and veterinary equipment.

Propel Labs, Inc.

Fort Collins

www.propel-labs.com

Experienced and knowledgeable instrument development team designing the next generation of bio-instrumentation tools. Focused on research tools, such as single cell analyzers and cell sorters.

Protomed, Inc.

Denver

www.protomed.net

Creates accurate anatomical models from CT scans by using the latest imaging software and laser driven technology.

Prototype Casting, Inc.

Denver

www.protcast.com

Manufactures non-ferrous prototype parts for the medical industry, specializes in RPM (Rubber Plaster Mold) casting, sand casting and rapid investment casting.

PTA Corporation

Longmont

www.ptacorp.com

Manufactures aluminum and steel molds for projects with lifetime runs of 5,000 to 250,000 pieces for medical applications.

Quest Product Development Corporation

Arvada

Helps bring to market medical products and analytical systems for small start-ups to research universities and international corporations. Grants from NIH, DOD, NASA and NIST.

Radiological Imaging Technology, Inc

Colorado Springs

www.radimage.com

Provides clinical and research physicists with a high precision automated QA tool for advanced radiation therapies.

Rand-Scot, Inc.

Fort Collins

www.randscot.com

Designs and manufactures products for persons with disabilities including BBD Cushions and Mattress Overlays, EasyPivot Patient Lifts, and Saratoga Exercise Products.

Rapid Prototyping Corporation

Longmont

www.rapidpro.com

Offers engineering and design and other manufacturing services for the medical device industry.

Research Electro-Optics

Boulder

www.reoinc.com

Volume manufacturer of high precision thin film coatings, optics and optomechanical assemblies for the ultraviolet through the long-wave infrared.

Rocky Mountain Instrument Company (RMI)

Lafayette

www.rmico.com

Designs and manufactures optics and coatings (ultraviolet through far infrared) for the medical industry.

Rocky Mountain Orthodontics, Inc. (RMO)

Denver

www.rmortho.com

Serves all areas of orthodontics including pediatric orthodontic prevention, interceptive pediatric orthodontics, mixed dentition orthodontics, adult orthodontics, reconstructive dentistry orthodontics, TMJ orthodontics, surgical orthodontics and breathing/sleep problem related orthodontics.

Samson Design Associates, Inc.

Boulder

www.samsondesign.com

Provides full service product development ranging from concept to production specifications, with many products for the medical field.

C Sandhill Scientific

Highlands Ranch

www.sandhillsci.com

Designs, manufactures and distributes diagnostic products focused on gastroenterology.

Sartorius TCC (formerly Denver Instrument Company)

Arvada

www.sartorius.us

Designs and manufactures analytical balances, electrochemistry instruments, moisture analyzers, and titration controllers.

Science Care

Denver

www.sciencecare.com

Provide human tissue for medical research and education. We serve as a link between individual donors and medical researchers and educators.

Scientech, Inc.

Boulder

www.scientech-inc.com

Manufactures analytical instruments: semi-micro balances, analytical balances, semi-analytical balances, and top-loading balances for the medical industry.

Scott Orthotic Labs, Inc.

Fort Collins

www.scottorthotic.com

Manufactures Orthotic and Prosthetic Components, Pre-fabricated Orthotics, and Custom O&P Devices.

C Securisyn Medical

Highlands Ranch

www.securisyn.com

Dedicated to a continuous process of increasing the safety and effectiveness of our unique life-saving product, which is utilized by skilled medical practitioners to deliver the highest quality emergency and intensive care to their patients.

Sealcon

Centennial

www.sealconusa.com

Manufactures cable management components, including liquid tight strain relief fittings, flexible conduit, M23 circular connectors and related products for the health care industry.

Shape Ophthalmics, LLC

Aurora

Develops state of the art devices and novel treatments for ophthalmic conditions through the application of advanced smart materials.

C Sharklet Technologies, Inc.

Aurora

www.sharklet.com

Engineers surface technologies (Sharklet™) that controls the growth of dangerous bacteria.

C Shippert Medical Technologies

Centennial

www.shippertmedical.com

Manufactures and distributes medical disposable products and instruments.

Sinopsys Surgical

Boulder

www.sinopsysurgical.com

Proprietary Lacrimal Sinus Diversion offers functional therapy for the 7 million sufferers of chronic sinusitis with minimal response to current pharmaceutical and surgical options.

C Siva Therapeutics, Inc.

Boulder

www.sivatherapeutics.com

Commercialize a proprietary therapeutic device technology, based on gold nanorods, that can be used both independently, and also in conjunction with existing and new cancer drugs.

SmartMove

Fort Collins

www.getsmartmove.com

Multi-sensor insoles automatically track physical activities and intensity, and wirelessly communicate to the smartphone app.

C Snoasis Medical

Denver

www.snoasismedical.com

Focused on the development and commercialization of regenerative tissue and medical device products for use in dental surgery.

C Soma Access Systems

Englewood

www.somaaccesssystems.com

Focused on designing, developing, and commercializing unique, cost-effective solutions for problems arising during specific medical procedures.

C SomaLogic, Inc.

Boulder

www.somallogic.com

Uses aptamer array technology and bioinformatics capabilities to discover disease-specific biomarkers and protein signatures. Develops medical diagnostics based on these signatures.

Sontec Instruments, Inc.

Centennial

www.sontecinstruments.com

Provides a broad line of instruments as well as custom instrument manufacturing and in-house repair service.

C Sophono, Inc.

Boulder

www.sophono.com

Developed the world's first non-percutaneous, implantable bone anchored hearing device.

C Sorin Group

Arvada

www.sorin.com

Global medical device company and a leader in the treatment of cardiovascular diseases.

Sound Surgical Technologies, LLC/Solta Medical, Inc.

Louisville

www.vaser.com

Offers ultrasonic technologies and related techniques for aesthetic surgery.

Sparton

Frederick

www.sparton.com

Leading contract manufacturer of low to medium volume, complex products for the medical device, biotech and industrial instrumentation markets.

C Spectranetics Corporation

Colorado Springs

www.spectranetics.com

Develops, manufactures, markets and distributes single-use medical devices used in minimally invasive procedures within the cardiovascular system.

ST Cardio Technologies, LLC

Broomfield

www.stcardio.com

Designs, develops, and manufactures electronic medical devices for use in electrophysiology cardiac cath labs.

St. Renatus, LLC

Fort Collins

www.st-renatus.com

First needle-free, dental anesthetic suitable for use in procedures involving most of the upper teeth. Uses an accurate and sophisticated method to anesthetize the upper teeth without the risk and pain of a needle.

StnDrd Infusion

Parker

www.stndrdinfusion.com

Early-stage medical device company in the drug infusion market with a standardized pump capable of performing the product requirements currently met by syringe, cassette, and ambulatory pump configurations.

Sundance Diagnostics, Inc.

Boulder

www.sundancedx.com

Working to develop the world's first genetic safety tests to predict a patient's risk of antidepressant-induced suicidal thinking or behavior.

Sunrise Medical, Inc.

Longmont

www.sunrisemedical.com

Provides home healthcare products including wheelchairs, respiratory, daily living aids, and speech augmentation devices.

C Surefire Medical, Inc.

Westminster

www.surefiremedical.com

The company is developing a novel infusion system for the interventional radiology market.

SurgiReal Products

Fort Collins

www.surgireal.com

Creates and introduces innovative products and methods for surgical training.

Supreme Cable Technologies, Inc.

Denver

www.supremecable.com

Manufactures quality custom cable assemblies and wire harnesses.

C Swan Valley Medical, Inc.

Aurora

www.swanvalleymedical.com

Developed a line of urology instruments that allow for safer, faster, and more economical treatment of common urological disorders.

Synaptic

Aurora

www.synapticusa.com

A non-invasive nerve therapy cleared to market by the FDA for acute and chronic pain relief.

Synergy Health Americas

Denver

www.synergyhealthplc.com

Offers electron beam sterilization for medical and pharmaceutical devices.

TRS, Inc.

Boulder

www.oandp.com/products/trs

Develops, manufactures, and markets body-powered prosthetic devices. Designs and builds technology for persons missing hands.

Tapeless Wound Care Products, LLC

Englewood

www.tapelesswoundcare.com

Manufactures and distributes a system of patented secondary wound dressing retention devices, offering an alternative to traditional secondary wound dressings, for both human and animals.

Tartan Orthopedics, Ltd.

Northglenn

www.tartanortho.com

Manufactures sacro lumbar belts, dorsal lumbar belts (corsets and moldable inserts), Ottenberg style elbow splint, pelvic traction belts, arm slings, cervical collars, acromioclavicular splints, and ankle supports.

TDA Research, Inc.

Wheat Ridge, Golden

www.tda.com

Provides automated catalyst testing equipment to large chemical companies and national laboratories.

Tech-X Corporation

Boulder

www.txcorp.com

Specializes in scientific and engineering software, including visualization and algorithm development.

Telsano Health

Aurora

www.telsano.com

Telsano manufactures both the preventive health monitoring devices that gathers and analyzes our personalized data but also provides the innovation to securely display your data and trend charts anywhere anytime.

TeraBAT

Longmont

www.terabat.com

Developing a disruptive detection platform based on terawaves technologies that will revolutionize disease diagnosis and patient care.

C Terumo BCT

Lakewood

www.terumobct.com

A global leader in blood component and cellular technologies, is the only company with the unique combination of apheresis collections, manual and automated whole blood processing, and pathogen reduction coupled with leading technologies in therapeutic apheresis and cell processing.

TheraTogs, Inc.

Telluride

www.theratogs.com

Produces an orthotic undergarment and strapping system that gives clients with sensorimotor impairment a new modality for improving postural alignment and stability.

C Tissue Fusion

Colorado Springs

Laser-based medical devices to fuse biological tissue together as an alternative to sutures or staples.

TMJ Implants, Inc.

Golden

www.tmj.com

Designs and manufactures alloplastic implants for the treatment of temporomandibular joint disorders and injuries.

C Touch of Life Technologies, Inc. (ToLTech)

Aurora

www.toltech.net

Develops procedural simulators in the areas of orthopaedics, gastroenterology, rheumatology, radiology, ophthalmology, and general surgical procedures.

Transtracheal Systems, Inc.

Englewood

www.tto2.com

Develops and manufactures innovative respiratory therapy products that advance medical therapy for persons requiring continuous supplemental oxygen, including the SCOOP transtracheal oxygen therapy system.

Transverse Medical

Evergreen

www.transversemedical.com

Developing the POINT-GUARD™ Embolic Protection System for cerebral and distal embolic protection during cardiovascular percutaneous interventions and surgical procedures.

Ultrathera Technologies, Inc.

Colorado Springs

www.ultrathera.com

Applying advanced technologies to physiological and neurological needs. Maker of AeroStim™ and PointScribe™.

C Value Plastics, Inc.

Fort Collins
www.valueplastics.com
 Designs and manufactures plastic tubing fittings and connectors.

C ValveXchange, Inc.

Greenwood Village
www.valvexchange.com
 Develops a bioprosthetic heart valve with a percutaneously-exchangeable leaflet set that provides lifetime service without anti-coagulation therapy.

Vista LifeSciences

Parker
www.vistalifesciences.com
 Innovative Healthcare Technology Solutions for Global Healthcare Challenges.

WalkMed Infusion, LLC

Englewood
www.walkmed.net
 Offers solutions for ambulatory infusion therapy and pain management.

WAVi Company

Boulder
 The platform is based on the Electroencephalograph (EEG) that integrates with physician diagnostic tools and a research library.

WestMed, Inc.

Greenwood Village
www.westmedinc.com
 Designs, manufacturers and markets medical devices to anesthesia and respiratory professionals.

Wi, LLC

Englewood
www.wiinc.net
 Designs and engineers medical devices. Including innovative services such as laser welding, assay design, and air bubble management.

Ximedix, Inc.

Colorado Springs
www.ximedix.com
 Manufactures and sells single patient use medical products for the anesthesia, respiratory care, critical care and emergency medicine applications.

Yamato Corporation

Colorado Springs
www.yamatocorp.com
 Manufactures and sells weighing equipment and systems for medical facilities.

Zetek, Inc.

Aurora
www.zetek.net
 Manufactures the OvaCue family of ovulation prediction products.

Zynex Medical, Inc.

Lone Tree
www.zynexmed.com
 Offers electrotherapy products, utilizing various methods of non-invasive muscle stimulation and electromyography technology, Interferential Current (IFC) and Transcutaneous Electrical Nerve Stimulation (TENS).

BIOTECHNOLOGY, PHARMA AND RELATED COMPANIES

C Accera, Inc.

Broomfield
www.accerapharma.com
 Commercial-stage healthcare company focused on the discovery and development of pioneering therapeutics to treat serious diseases. Accera has developed Axona, the first proprietary commercialized Alzheimer's disease therapy that address the well recognized physiological hallmark and metabolic defect of hypometabolism, the brain's inability to optimally metabolize glucose.

C ADA Technologies, Inc.

Littleton
www.adatech.com
 Development and commercialization of innovative technologies.

Advanced Regenerative Therapies (ART)

Fort Collins
www.art4dvm.com
 Provides a stem cell isolation and expansion service for veterinary medicine.

Agilent Nucleic Acid Solutions

Boulder
www.agilent.com
 Develops and manufactures therapeutic oligonucleotide.

Agripro COKER

Berthoud
www.agriproheat.com
 Develops and delivers superior wheat seed genetics in North America.

AKTIV-DRY

Boulder
www.aktiv-dry.com
 Provides dry powder processing solutions for the vaccine, pharmaceutical, and biotechnology industries.

Albany Molecular Research, Inc. (AMRI)

Denver
www.amriglobal.com
 Performs services including drug discovery, pharmaceutical development, and manufacturing of active ingredients and pharmaceutical intermediates for many of the world's leading healthcare companies.

Allergan, Inc.

Highlands Ranch
www.allergan.com
 Multi-specialty health care company focused on discovering, developing and commercializing innovative pharmaceuticals, biologics, medical devices and over-the-counter consumer products.

American Allied Biochemical, Inc.

Aurora
www.aablabs.com
 Specializes in the purification and distribution of restriction endonucleases enzymes.

C Amgen, Inc.

Boulder, Longmont
www.amgen.com
 Discovers, develops, manufactures and markets human therapeutics based on advances in cellular and molecular biology. Amgen's operations in Colorado are dedicated to the mission of assuring patient supply and creating a world-class capability for rapid commercialization, launch and transfer of bulk biopharmaceutical products. In addition to licensed manufacturing of EPOGEN, NPlate, XGEVA, Prolia and clinical therapeutics, Amgen Colorado pursues strategic contract manufacturing opportunities.

C AmideBio, LLC

Boulder

www.amidebio.com

Focused on providing peptide and protein research reagents and clinical products for a diverse array of research and commercial targets using proprietary Biopure-Process™ technology.

C Ampio Pharmaceuticals, Inc.

Greenwood Village

ampio-pharma.com

Development stage biopharmaceutical company focused on the discovery and development of novel therapies aimed at treating common inflammatory conditions for which there are limited treatment options.

C AntriaBio

Denver

antriabio.com

Lead diabetes product candidate, AB101, is a once-a-week injectable basal insulin that is currently in preclinical development. AB101 is administered by subcutaneous injection and targets patients with type 1 and type 2 diabetes who require basal insulin for the control of hyperglycemia.

Anabolic Laboratories

Colorado Springs

www.anaboliclabs.com

Focused line of nutritional products, with state-of-the-art pharmaceutical manufacturing facilities in California and Colorado.

Animal Health Options

Golden

www.animalhealthoptions.com

Animal Health Options has been offering high quality antioxidants and nutritional supplements that meet or exceed industry standards and provide a noticeable benefit to dogs, cats and horses.

C AnImmune LLC

Golden

Infectious disease centric company focused on enhancing efficacy of animal vaccines using knowledge accumulated through decades of human vaccine technology.

C ApopLogic Pharmaceuticals, LLC

Aurora

www.apoplogic.com

Focused on the development and commercialization of Breceptin, a unique oncolytic drug for the treatment of a wide range of solid tumors.

Aquatic BioSystems

Fort Collins

www.aquaticbiosystems.com

Full-service organism culturing facility specializing in the production and distribution of freshwater and marine organisms for aquatic toxicology, biomonitoring and other research activities.

C ARCA biopharma, Inc.

Broomfield, Aurora

www.arcabiopharma.com

Specializes in developing and commercializing genetically-targeted therapies for heart failure and other cardiovascular diseases.

C Array BioPharma

Boulder, Longmont

www.arraybiopharma.com

Discovers, develops and commercializes targeted small molecule drugs to treat debilitating and life-threatening diseases such as cancer.

C Arrien Pharmaceutical

Salt Lake City, UT

www.arrienpharma.com

Small molecule targeted therapeutics drug discovery and development company working towards targeting kinase signaling pathways.

C Atlas Biologicals, Inc.

Fort Collins

www.atlasbio.com

Manufacture, market and distribute animal sera and cell culture reagents.

Aurogen

Fort Collins

www.aurogen.com

Produces a pharmaceutical treatment for diabetic neuropathy, with a second invention showing that neurotrophic hormones can act across the blood-brain barrier to treat various brain disorders.

Aurora Oncology

Aurora

Researching DT-EGF Toxic Fusion Protein for treatment of bladder cancer.

C Avidity, LLC

Aurora

www.avidity.com

Develops and sells molecular affinity tools for connecting molecules.

C BaroFold, Inc.

Aurora

www.barofold.com

Pressure Enabled Protein Manufacturing (PreEMT™) technology to improve the tolerability, efficacy and safety of a wide variety of protein therapeutics for biopharmaceutical companies, research institutions, and government agencies.

BioResponse, LLC

Boulder

www.bioresponse.com

Researches, develops and commercializes dietary supplements for better absorption and functional foods.

BioServe Space Technologies

Boulder

www.colorado.edu/engineering/BioServe

Researches space life science with a wide range of biotechnology applications involving animals, plants and microorganisms. Specializing in conducting microgravity life science research and designing and developing space flight hardware.

Biosyntrx, Inc.

Colorado Springs

www.biosyntrx.com

develops nutraceuticals to address the micronutrient needs of the dry eye, cataract, macular degeneration, glaucoma and diabetic retinopathy patient.

Bolder BioTechnology, Inc.

Boulder

www.bolderbio.com

Uses advanced protein engineering technologies to create proprietary human protein pharmaceuticals with enhanced therapeutic properties.

Boulder Scientific Company

Mead

www.bouldersci.com

Provides organometallic compounds to the pharmaceutical, polymer, and specialty chemical industries.

Brotica

Bellvue

Produces Interval33, a termite attractant which works by producing the precise level of CO₂ that has been shown to attract termites, all natural and animal safe.

Cargill Research

Fort Collins

www.cargill.com

Develops, processes and markets science-based, health promoting ingredients for food and dietary supplement industries worldwide.

Catalent Pharma Solutions, Inc.

Boulder

www.catalent.com

Designs, manufactures and distributes specialized medical products for fluid management of pleural effusion and ascites.

C CBL (Chemical and Biopharmaceutical Laboratories)

Boulder

www.cblbiopharma.com

Offering peptide starting materials, peptide intermediates, and industrial and commercial-scale manufacturing of proprietary and generic GMP and non-GMP peptides.

Cedarburg Hauser

Denver

www.cedarburghauser.com

Full service API manufacturer of GMP materials that include small molecule APIs, adjuvants, conjugates and toll manufacturing substances.

Cell>Point

Centennial

www.cellpointweb.com

Develops novel radiopharmaceutical imaging agents, radiotherapeutic agents and local regional radio/chemotherapeutic drug delivery systems for the diagnosis, treatment and post therapy assessment of cancer, cardiovascular disease, infectious disease and metabolic diseases.

Cetya Therapeutics, Inc.

Fort Collins

Founded to commercialize analogs of the class I isoform selective histone deacetylase inhibitor (HDACi) largazole, targeting unmet medical needs, especially in oncology, neurodegeneration, autoimmunity, and hemoglobinopathies.

Cévan International, Inc.

Longmont

www.cevan.com

Delivers vitamins, minerals and botanical extracts as well as specialty nutraceutical formulations and antioxidants.

CHATA Biosystems

Fort Collins

www.chatasolutions.com

Manufactures blended reagents, HPLC mobile phases, standards, buffers and dissolution media.

C CHD Bioscience, Inc.

Fort Collins

www.chdbioscience.com

Advancing patient care through the creation of novel antimicrobials for the prevention and treatment of infectious disease.

C ClinImmune Labs

Aurora

www.clinimmune.com

Comprises five laboratories to provide services to kidney, heart, lung, pancreas, and hematopoietic stem cell transplant programs around the world.

C Clovis Oncology, Inc.

Boulder

www.clovisoncology.com

Focused on acquiring, developing and commercializing innovative anti-cancer agents in the US, Europe and additional international markets.

Colorado Biolabs, Inc.

Frederick

www.proferrin.com

Colorado Biolabs, Inc., the manufacturer of Proferrin® ES and Proferrin® Forte, was founded in 1997 with a plan to develop and market Proferrin – an oral iron supplement made from heme iron polypeptide (HIP). Our proprietary process results in an oral iron product that provides an optimal amount of HIP in a single tablet.

Colorado Genetics, Inc.

Loveland

www.coloradogenetics.com

Provides livestock embryo-transfer research, artificial insemination, embryo collection, freezing and transfer, and international import and export services.

C Colorado Histo-Prep (CH-P)

Fort Collins

www.histoprep.com

Produces high quality slides, clinical chemistry and hematology data and fully integrated and detailed seamless pathology reports.

Colorado Micro Tech

Fort Collins

Focused on improving the workflow of the Anatomic Pathology laboratory of today by applying new and creative microfluidics technologies developed at Colorado State University.

Colorado Serum Company

Denver

www.colorado-serum.com

Supplies veterinary biologic vaccines, instruments, laboratory reagents and serums for the veterinary industry.

C Corden Pharma

Boulder

www.cordenpharmacolorado.com

Corden Pharma Colorado is the small to large-scale resource for peptides manufacturing.

C Crestone, Inc.

Boulder

www.crestonepharma.com

Drug discovery and development company focused on developing novel treatments for serious bacterial infections.

C Cytoskeleton, Inc.

Denver

www.cytoskeleton.com

Offers kits for drug screening, signal transduction and cytoskeletal research specializing in the production of purified proteins and easy-to-use kits to study biochemical and cellular processes.

C DaVita Clinical Research (DCR)

Denver

www.davitaclinicalresearch.com

Offers a complete array of early-phase study capabilities through its two state-of-the-art research facilities.

C DxRx

Aurora

Developing small molecules that stimulate the number and function of white blood cells.

Efficas, Inc.

Boulder

www.efficass.com

Develops bioactive products that offer natural relief from asthma and allergies in both humans and animals.

C = CBSA Member

ELISA Tech

Aurora

www.elisatech.com

Provides immunoassays for the measurement of cytokines, growth factors, and lipid inflammatory mediators.

Entero Track

Centennial

Next generation monitoring of gastrointestinal allergic diseases

Evolutionary Genomics (EG)

Lafayette

www.evolgen.com

Identifies genes with a high likelihood of commercial value for downstream validation through their proprietary Adapted Traits platform.

C Flagship Biosciences

Boulder

www.flagshipbio.com

Oncology drug development and tissue analytics and pathology services.

C FluTrends International/STS Health

Denver, Aurora

www.stshealth.com

Biotechnology company that plans to develop and commercialize products for the prevention of influenza.

C Gates Biomanufacturing Facility

Aurora

medschool.ucdenver.edu/stemcell

Good Manufacturing Practices Facility FDA approved for production of biologicals from Cell Culture and microbial fermentation suitable for early clinical trials in humans.

Gene Check, Inc.

Greeley

www.genecheck.com

Gene Check is a diagnostic laboratory specializing in veterinary genetics. In addition, Gene Check maintains a dynamic biotech research program, including rare DNA sequence and SNP detection.

C Genentech

Denver

www.gene.com

Using human genetic information to discover, develop, manufacture and commercialize medicines to treat patients with serious or life-threatening medical conditions.

Genesis Laboratories, Inc.

Wellington

www.genesislabs.com

Provides services to clients in the agrochemical and pharmaceutical industries, rodenticide research and development, as well as invasive species, zoonotic disease, and conservation research.

GeneThera, Inc.

Westminster

www.genethera.net

Develops and markets the latest molecular technologies to eradicate “cross over” diseases such as Johne’s Disease, Mad Cow Disease, Chronic Wasting Disease, and E.coli. Develops assay tests and vaccines to eradicate the threat to humans of diseases transmitted up the food chain by cattle, elk and deer.

Gonex, Inc.

Fort Collins

www.cedusinc.com

Dedicated to the research, development and commercialization of hormonal based health care strategies for both the human and companion animal markets including technology for sterilizing companion animals with a single injection.

C GlaxoSmithKline

Denver

www.gsk.com

Produces medicines that treat six major disease areas – asthma, virus control, infections, mental health, diabetes and digestive conditions as well as vaccines and new treatments for cancer.

Gliacor Therapeutics, LLC

Fort Collins

Characterize the efficacy and safety of a novel series of antiinflammatory compounds to test their suitability as a new treatment for blocking the progression of Parkinson’s.

C GlobeImmune, Inc.

Louisville

www.globeimmune.com

Discovers, develops and manufactures potent, targeted molecular immunotherapies called Tarmogens, targeted antigens that distinguish diseased cells from normal cells, for the treatment of cancer and infectious diseases.

Great Lakes Pharmaceuticals

Denver

www.glpharma.com

Development leading to commercialization of innovative, effective product for prevention of catheter related microbial infections in clinical and in outpatient settings.

Greffex, Inc./Isogenis, Inc.

Aurora

www.greffex.com

Develops and produces new therapeutics for immune suppression in humans to prevent transplant rejection, improve gene therapy and develop novel approaches to the treatment of autoimmune diseases.

Hauser Laboratories, Division of Microbac

Boulder

www.hauserlabs.com

Provides research, development, and testing to the pharmaceutical, natural products, dietary supplement, and medical device industries.

C HemoGenix

Colorado Springs

www.hemogenix.com

Private contract research service and assay development laboratory specializing in developing predictive in vitro assay platforms for primary human and animal target cells and stem cell hemotoxicity testing.

C HepQuant, LLC

Aurora

www.hepquant.com

Designed test parameters using continuous variables that may be correlated to clinical features or may be followed over time to measure disease progression. HepQuant-E is non-invasive, uses stable (not radioactive) isotopes, and relies on natural, well-defined hepatic functions to measure the portal circulation.

Heska Corporation

Loveland

www.heska.com

Develops advanced diagnostics and specialty products for veterinary practices that focus on companion animals.

Hiberna Corporation

Boulder

Pursuing the potential clinical application of hibernation in order to slow metabolism thereby extending survival limits in traumas that reduce oxygen to certain cells, e.g. in the heart and brain.

Hospira, Inc.

Boulder

www.hospira.com

Supplies injectable generic and specialty pharmaceuticals. The Colorado site specializes in the supply of active pharmaceutical ingredients for both internal and external markets.

ICVrx

Aurora

www.icvrx.com

Drug reformulations and delivery systems targeting disorders of the central nervous system.

imuTek Laboratories, Inc.

Fort Collins

www.imutek.com

Develops and markets bovine colostrums for the nutrition and health products industry. The first manufacturer to receive an indication for colostrum for the passive transfer of antibodies (immunoglobulins) in dry powder form.

C InViragen, Inc./Takeda America Holdings, Inc.

Fort Collins

www.inviragen.com

Focused on developing life-saving vaccines to protect against emerging infectious diseases worldwide. Inviragen's lead product is a vaccine to protect against dengue fever.

InVitria

Fort Collins

www.invitria.com

InVitria develops, manufactures and markets a portfolio of high performance and well defined cell culture products and reagents used in bioprocessing, biopharmaceutical formulation, stem cell & regenerative medicine, life science research and diagnostics.

C Johnson & Johnson

Denver

www.jnj.com

Manufactures a broad selection of health care products, as well as a provider of related services, for the consumer, pharmaceutical, and medical devices and diagnostics markets.

JHPIEGO-Denver

Aurora

Designing and implementing effective, low-cost technologies – first product aimed at improving the management of postpartum hemorrhage.

Keeton Industries, Inc.

Wellington

www.keetonaqua.com

Researches and develops biological water treatment, aeration, ozone aeration, solids removal, biofiltration and other new technologies.

Kimball Genetics, Inc.

Denver

www.kimballgenetics.com

Genetic testing laboratory specializing in DNA analysis for common genetic disorders that are preventable or can be treated.

C KromaTid, Inc.

Fort Collins

www.kromatid.com

Develops a method and kit using chromatid paints to improve detection of chromosomal inversions. The improvement is important to medical applications such as cancer and birth defects.

C LABS, Inc.

Denver

www.labs-inc.org

Provides laboratory testing services focused on donor eligibility determination and final product safety; infectious disease, microbiology, histocompatibility and environmental monitoring.

C Legacy BioDesign, LLC

Johnstown

www.LegacyBioDesign.com

Conducts peptide and protein formulation and assay development work for biopharma companies. The company also specializes in drug delivery and process development of biotechnology-based products.

C Life BioScience, Inc.

Longmont, Aurora

www.lifebioscience.com

Develop and commercialize innovative product platforms.

LifeTime Pharmaceuticals

Aurora

Developing several classes of small molecules that stimulate production and function of WBCs.

C Lohocla Research Corporation

Aurora

www.lohocla.com

Research & development company that is at the forefront of discovery of medications for chronic pain, addictive and other mental health and neurological disorders.

MacLeod Pharmaceuticals, Inc.

Fort Collins

www.macleodpharma.com

Develops and manufactures anti-bacterial pharmaceuticals for the veterinary industry.

Martek Biosciences Corporation

Boulder

www.martek.com

Develops, manufactures and sells products from microalgae. Products include nutritional supplements and food ingredients which play a role in promoting mental and cardiovascular health.

C MBC Pharma, Inc.

Aurora

www.mbcpharma.com

Biopharmaceutical company focused on discovering and developing drugs for bone diseases such as cancer and osteoporosis.

C MedImmune, LLC

Denver

www.medimmune.com

Strives to provide better medicines to patients, new medical options for physicians, and rewarding careers to employees.

Mediral International, Inc.

Denver

www.mediral.com

Develops, manufactures and sells homeopathic pharmaceuticals taking into consideration antidotes.

Membrane Protective Technologies Inc.

Fort Collins

www.membrane-protect.com

Blend of organic plant extracts which improves artificial insemination pregnancy rates in cows.

C = CBSA Member

C MenoGeniX

Aurora

www.menogenix.com

Clinical stage biotechnology company focused on the development of an approved drug, in a new indication, menopause, and the menopause-like symptoms that occur in certain breast and prostate cancer patients.

C Merck & Co., Inc.

Denver

www.merck.com

Merck and Co. produces products that cover a broad range of areas, including heart and respiratory health, infectious diseases, sun care and women's health. And they focus their research on conditions that affect millions of people around the world – diseases like Alzheimer's, diabetes and cancer – while building strengths in new areas like biologics.

C MicroBiome Therapeutics, LLC

Broomfield

www.mbiome.com

Clinical stage biotechnology company developing pharmaceutical and medical food products that aim to improve health status by interacting with and altering the human microbiome.

C miRagen Therapeutics

Boulder

www.miragentherapeutics.com

Improves patients' lives by developing innovative microRNA (miRNA) based therapeutics for the treatment of cardiovascular and muscle disease. miRNAs, are a recently discovered class of small RNAs encoded in the genome, are short, single-stranded RNA molecules.

Molecular BioSciences, Inc.

Boulder

www.molbio.com

Manufactures products such as water soluble biotinylation reagents, vitamin derivatives, crosslinking reagents, lipophilic probes, fluorophores, radioiodination reagents, and dendritic cores for preparing oligomers.

MonImmune Therapeutics

Fort Collins

Developing a pipeline of repurposed compounds focused on monocyte regulation as vaccine adjuvants.

C Monsanto Company

Englewood

www.monsanto.com

Leading global provider of technology-based solutions and agricultural products that improve farm productivity and food quality.

C Mosaic Biosciences

Denver, Aurora

mosaicbio.com

Start-up company focused on the development of innovative materials for tissue regeneration and repair.

C N30 Pharmaceuticals, LLC

Boulder

www.n30pharma.com

Drugs target nitric oxide reductase (NOR), the most important of which is s-nitrosoglutathione reductase (GSNOR) an enzyme of central importance in human health and disease.

C Nanoly Bioscience, Inc.

Denver

www.nanoly.info

Developing a safe and proprietary polymer encapsulation to stabilize and protect therapeutic biological molecules, such as vaccines and enzymes, from below freezing to beyond tropical room temperatures.

NanoTrans Technologies

Aurora

Early-stage company focused on developing a novel ophthalmic drug delivery platform that will topically deliver drug therapies to both the front and back of the eye.

Novartis Pharmaceuticals Corporation

Broomfield

www.novartis.com

Researches and develops products to protect and improve health and well-being with core businesses in pharmaceuticals, vaccines, consumer health, generics, eye care and animal health.

C Novus Biologicals, Inc.

Littleton

www.novusbio.com

Develops, tests and markets antibodies for research of human diseases such as cancer, cardiovascular and neurological disorders.

C Oberon FMR

Aurora

www.oberonfmr.com

Early stage company with proprietary technology capable of producing a cost-effective, sustainably produced protein meal. Product serves as a fish meal replacement (FMR) or additive ingredient for animal feeds, primarily those destined for the aquaculture industry.

C Omni Bio Pharmaceutical, Inc.

Greenwood Village

www.omnibiopharma.com

In preclinical development of a recombinant form of alpha-1 antitrypsin ("AAT").

C OncoTherix

Aurora

www.oncotherix.com

Clinical stage oncology company focused on the development of InCell-RT (Intracellular radiotherapy) for the treatment of locally-advanced cancers (LACs). InCell-RT is a unique, DNA-ligated, nanometer-scale intracellular radiotherapy with the potential to selectively kill cancer cells without causing damage to surrounding healthy tissue and without the development of treatment resistance.

OnKure, Inc.

Longmont

Exploring a highly potent and selective HDAC inhibitor as an anti-tumor drug.

C OPX Biotechnologies

Boulder

www.opxbiotechnologies.com

Technology platform enables rapid, rational, and robust optimization of microbes and bioprocesses to manufacture bioproducts with equivalent performance and improved sustainability at lower cost compared to petroleum-based alternatives.

Pambec Laboratories, Inc.

Loveland

Researches drug discoveries in the field of AIDS.

Peak Analytical, Inc.

Golden

www.peaklab.net

Specializes in materials and chemical analysis. Performs a variety of molecular and atomic level spectroscopic techniques to identify failures and defects.

C PeptiVir

Aurora

www.peptivir.com

PeptiVir is an early stage biopharmaceutical company focused on the development and commercialization of a conformationally-constrained, synthetic peptide-based vaccine platform for the prevention of viral diseases.

C Pfizer Pharmaceutical Company

Centennial

www.pfizer.com

Discovers, develops, manufactures, and markets prescription medicines for humans and animals.

PhosphoSolutions, LLC

Aurora

www.phosphosolutions.com

Designs and produces phosphoproteins solutions using phosphor-specific antibodies. Phosphoproteins are thought to be critical elements in neurological diseases such as Alzheimer's and in cancer.

Pisces Molecular

Boulder

www.pisces-molecular.com

Focused on applying molecular genetics technology to problems of fisheries and aquatic conservation biology.

Plura Biosciences, Inc.

Lafayette

www.plurabioscience.com

Specialized catalysts and chemicals that enable highly efficient, cost effective and green chemistry solutions in the manufacture of important life science products.

Qgenta

Aurora

Harnessing innovative chemistry and biology in the development of molecular targeted agents for the treatment of cancer.

Quark Pharmaceuticals, Inc.

Boulder

www.quarkpharma.com

Discovers and develops siRNA drug candidates for treating Age-related Macular Degeneration and prevention of Acute Renal Failure.

Quicksilver Scientific

Lafayette

www.quicksilverscientific.com

Clinical and environmental mercury lab and dietary supplement manufacturing.

Rapid Scientific Solutions, LLC

Golden

www.rapid-scientific.com

Premier pharmaceutical chemistry development organization supporting the pharmaceutical and biotechnology industries.

Regenerative Sciences, Inc.

Broomfield

www.regenexx.com

Advances stem cell therapies through development of Regenexx™, an injection procedure to treat a wide variety of painful conditions.

Renaptys Vaccines, LLC

Aurora

www.renaptys.com

Developing innovative Stable Peptide Immunogen (SPI) platform that targets α -helical epitopes, initially, fusion receptors on viruses.

Roche Custom Biotech

Indianapolis, IN

www.roche-applied-science.com

Customize and supply reagents, products and services, customized to the quality and regulatory needs of the customer.

C Rocky Mountain Biosystems, Inc.

Wheat Ridge

Research and development of transdermal pharmaceuticals and delivery systems, cosmetic devices, and tissue adhesives.

Rocky Mountain Diagnostics, Inc.

Colorado Springs

www.rmdiagnosics.com

Provides immunodiagnostic assays and reagents for biogenic amines, research reagents, a CLIA certified reference laboratory and contract manufacturing services.

Rocky Mountain Instrumental Laboratories

Fort Collins

www.rockylab.com

Provides contract chromatographic and mass spectrometric analysis of pharmaceuticals (both traditional drugs and biotechnology products, such as proteins and peptides and oligonucleotides), veterinary and human endocrinology, and forensic toxicology.

Rocky Mountain Reagents, Inc.

Golden

www.rmreagents.com

Manufactures stains, culture media and chemistry solutions for the medical industry, as well as titration reagents, indicators, acids, bases, and a variety of chemicals for industrial uses.

Saigene Biotech, Inc.

Denver

Developing testing processes to identify harmful algae blooms.

Sandoz

Broomfield

www.us.sandoz.com

Focuses on pharmaceuticals, consumer health, generics, eye care and animal health. Therapeutic categories include anti-infectives, anti-arthritis, cardiovasculars, gastrointestinal agents & psychotherapeutics.

C Silvergate Pharmaceuticals, Inc.

Greenwood Village

silvergatepharma.com

Developer and manufacturer of pharmaceutical products focused on the pediatric market.

SixOne Solutions, LLC

Aurora

www.sixonesolutions.com

Developing novel products for the treatment and diagnosis of breast cancer.

STA Laboratories, Inc.

Longmont

www.stalabs.com

Agricultural product testing laboratory that offers seed quality, genomics, plant health and diagnostic services and products.

Summit Plant Laboratories, Inc.

Fort Collins

www.plantlabs.com

Applies laboratory plant cloning and greenhouse technologies to produce planting stocks for breeders, greenhouses, and field crop producers.

C SuviCa, Inc.

Boulder

www.suvica.com

Discovery and development of small molecules for the treatment of cancer.

C = CBSA Member

C Sypharma Pty. Ltd.

Victoria, Australia
www.sypharma.com.au
 Specialist Sterile GMP Drug Development Manufacturer. Commercial Drug Manufacture of medicines and medical devices. ISO 13485 TGA/EU GMP

Taiga Biotechnologies, Inc.

Aurora
www.taigabiotech.com
 Develops cellular, biologic and small molecule approaches to treat hematological diseases, including cancers, immunodeficiencies and autoimmune conditions.

C Thermo Fisher Scientific

Lafayette
www.thermofisher.com
 Scientific leadership and innovation in RNAi, Gene Expression, qPCR/PCR Detection, and Molecular Biology technologies come together with the Thermo Scientific Dharmacon, Open Biosystems, ABgene, Finnzymes, and Fermentas product lines to provide world-leading solutions for gene analysis.

C TOLMAR, Inc.

Fort Collins
www.tolmar.com
 Develops and manufactures both proprietary and generic pharmaceutical products with specific focus in therapeutic areas of dental, dermatology, and oncology.

C TopGear Automation

Hartsel
www.topgearautomation.com
 Development and validation of biomarkers for environmental exposure, oncology, and related diseases.

UBPBio

Aurora
 Manufactures and sells bioreagents related to the ubiquitin-proteasome pathway.

C UCB, Inc.

Brussels, Belgium
www.ucb.com
 Global biopharma focused on severe diseases with operations in about 40 countries.

Upsher-Smith Laboratories, Inc.

Denver
www.upsher-smith.com
 Develops, manufactures and markets a vast range of prescription and over-the-counter products for cardiology, dermatology, women's health and other areas.

C Venaxis, Inc.

Castle Rock
www.venaxis.com
 Primarily focused on advancing towards commercialization, our recently patented blood-based human diagnostic test, AppyScore™ to aid in the diagnosis of human appendicitis and several novel reproduction drugs for use in high value animals.

C Ventria Bioscience

Fort Collins
www.ventria.com
 Develops a protein expression technology platform called ExpressTec with a product pipeline in human nutrition and therapeutics.

Ventrus Biosciences, Inc.

Greenwood Village
www.ventrusbio.com
 A specialty pharmaceutical company focused on the late-stage development and commercialization of gastroenterology products.

C Veramarx, LLC

Boulder
www.veramarx.com
 Our mission is to become the leading provider of credible clinical and scientific information, reliable and accurate diagnostic tools and effective treatment options for Lyme disease.

Verdant BioSciences Corporation

Denver
www.verdantbio.com
 Develops plant biochemical regulators that provide superior plant performance and unlock the productive power of plants in markets from floriculture to industrial agriculture.

C VetDC

Fort Collins
www.vet-dc.com
 Focused on development of novel devices, diagnostics and therapeutics for emerging veterinary markets.

C ViroCyt, LLC

Denver
www.virocyt.com
 Focused on the commercialization of novel technologies that enable rapid quantification of viruses, such as the Virus Counter 3100.

C Vitro Biopharma

Golden
www.vitrobiopharma.com
 Develop and commercialize adult stem cell technology for applications in stem cell research, drug discovery & development and therapeutic products for treatment of disease, injury and tissue regeneration.

Vitrolife, Inc.

Englewood
www.vitrolife.com
 Develops, manufactures and sells products and systems for the preparation, cultivation and storage of human cells, tissue and organs. Product areas include fertility, transplantation and stem cell cultivation.

C Vivaldi Biosciences

Fort Collins
www.vivaldibiosciences.com
 Developing advanced vaccines for prevention of common seasonal influenza ("flu") and emergent pandemic flu.

VRL Laboratories

Centennial
www.vrl.net
 Laboratory offers full service regulated donor eligibility testing for the human cell and tissue community.

Warren Analytical Laboratory

Greeley
www.warrenlab.com
 Specializes in food microbiology, molecular biology, food chemistry, residue chemistry and nutritional labeling.

Western States Biopharmaceuticals, Inc.

Aurora
www.westernstatesbiopharm.com
 Novel anti-inflammatory therapeutics for autoimmune diseases.

Wildlife Pharmaceuticals, Inc.

Fort Collins
www.wildpharm.com
 Providing pharmaceuticals for the safe and humane care of non-domestic and exotic wildlife species.

Xalud Therapeutics

Boulder

www.xaludthera.com

Developing novel therapies for inflammatory diseases of the central nervous system and joints.

YewSavin, Inc.

Fort Collins

www.ajorganica.com

Develops chemical and biochemical technologies. Successfully finished multi-step syntheses using Bromination, Grignard reaction, Suzuki coupling, Amidation, and Esterification reactions.

ZeoponiX, Inc.

Boulder

www.zeoponix.com

Develops NASA originated technology to produce a soil amendment/fertilizer zeoponic material that utilizes nutrients more efficiently and reduces nutrient leaching into the environment.

C Z Biotech, LLC

Aurora

www.zbiotech.com

Cost-effective biochemical analysis solutions, our focus is to develop innovative microarray and carbohydrate products and related services.

BIOFUELS AND RELATED COMPANIES

BBI International

Lakewood

www.bbibiobiofuels.com

Offers consulting services, including feasibility studies, market analyses, site & resource assessments, economic impact studies, business plans, industry benchmarking and industry surveys to the biofuels sector.

C The Biocer Group of Companies

Englewood

Emerging group of companies in Agriculture, Forestry, and Biotechnology space. The group has developed its own novel mechanism of multibillion dollar financing and is now prepared to launch a series of emerging bioscience companies.

BioFuel Energy Corporation

Denver

www.bfenergy.com

Constructs large scale ethanol production facilities in cooperation with Cargill and owns and operates two of the largest dry mill ethanol facilities in the United States.

BioVantage Resources, Inc.

Golden

bvialgae.us

Delivers algae-based bioremediation solutions for municipal, industrial and agricultural wastewater treatment.

Carbo Analytics, LLC

Fort Collins

www.carboanalytics.com

Commercial development of an online sugar monitor with immediate application for more cost effective biofuels production.

Colorado Center for Biorefining and Biofuels (C2B2)

Boulder

www.c2b2web.org

A cooperative research and educational center devoted to the conversion of biomass to fuels and other products. Works to establish ground-breaking research and educational programs for the advancement of renewable energy technologies.

C Ciris Energy, Inc.

Centennial

www.cirisenergy.com

Start-up company developing a unique biotechnology for the conversion of fossil sources of carbon such as low rank coals to natural gas and valuable chemicals.

Community Power Corporation

Englewood

www.gocpc.com

Develops, commercializes and markets modular biopower systems to meet the needs of distributed energy consumers in both developing and developed countries.

Front Range Energy, LLC

Windsor

www.frontrangeenergy.com

Ethanol producer since 2006. Will process approx. 40 million gallons of ethanol and 396,000 tons of wet distillers' grain annually.

GeoSynFuels, LLC

Golden

www.geosynfuels.com

Develops a low-cost method to convert cellulosic biomass into fuel. The technology uses biological mechanisms set in a solid-state fermenter ("SSF") to convert the biomass into ethanol and/or methane.

C Gevo, Inc.

Englewood

www.gevo.com

Develops advanced biofuels like isobutanol, butanol that will provide a sustainable path to the replacement of petrochemicals like gasoline, diesel and jet fuel.

Novo Energy, LLC

Fort Collins

www.novoenergyllc.com

Colorado-based renewable energy company that provides state-of-the-art technology, equipment, and project support services for the renewable energy and solid waste disposal industries.

PolyNEW, Inc.

Golden, Aurora

www.polynewinc.com

Developed a new class of PLA bioplastics which it terms "ecobionanocomposites." These are nanocomposites from 100% renewable resources that could be used in a wide variety of applications including medical device applications.

PureVision Technology, Inc.

Fort Lupton

www.purevisiontechnology.com

Develops a carbon-neutral biomass fractionation technology that converts cellulosic biomass into sugars, energy and fiber that are bio-based raw materials to make many industrial and consumer products.

Solix BioSystems, Inc.

Fort Collins

solixbiosystems.com

Developed and successfully deployed a robust algal growth system (AGS[®]) that is based on its proprietary extended-surface area closed photobioreactor panels.

C = CBSA Member

Sterling Ethanol, LLC

Sterling

www.sterlingethanol.com

Produces 42 million gallons of ethanol annually, using the distiller's grain produced as a co-product of ethanol to the areas cattle feeders for its high protein levels.

Sundrop Fuels, Inc.

Louisville

www.sundropfuels.com

A solar gasification-based renewable energy company.

ZeaChem

Lakewood

www.zeachem.com

Developed a cellulose-based biorefinery platform capable of producing third-generation ethanol fuel and intermediate chemicals. Our indirect approach leapfrogs the yield and carbon dioxide (CO2) problems associated with traditional and cellulosic based ethanol processes.



RESEARCH AND EDUCATION INSTITUTIONS

C Advanced Diagnostic Laboratories (Adx) at National Jewish Health

Denver

www.njlabs.org

National Jewish Health is known worldwide for treatment of patients with respiratory, cardiac, immune and related disorders, and for groundbreaking medical research. The Advanced Diagnostic Laboratories provide innovative services within the extraordinary clinical and research environment of National Jewish Health. Leveraging our expertise in both laboratory medicine and personalized medicine, we offer an ever-expanding menu of diagnostic tests, as well as contract research services. Our laboratories are CAP and CLIA certified, and have earned the prestigious CAP 15189SM accreditation.

C BioFrontiers Institute

Boulder

biofrontiers.colorado.edu

State-of-the art research and education facility that links the basic sciences, engineering, clinical practice, and industry at the University of Colorado's Boulder campus. Biological Sciences Curriculum Study (BSCS) Colorado Springs www.bsccs.org A nonprofit corporation that endeavors to improve all students' understanding of science and technology by developing exemplary curricular materials, supporting their widespread and effective use, providing professional development, and conducting research and evaluation studies.

Biological Sciences Curriculum Study (BSCS)

Colorado Springs

www.bsccs.org

A nonprofit corporation that endeavors to improve all students' understanding of science and technology by developing exemplary curricular materials, supporting their widespread and effective use, providing professional development, and conducting research and evaluation studies.

Bonfils Blood Center

Denver

www.bonfils.org

One of the nation's leading community blood centers through their commitment to quality service, innovation, research and technology. They offer a full range of blood products and

services to healthcare partners including supplying rare blood units or helping to determine the best cross-matched unit to endure the best possible patient outcomes.

C Catholic Health Initiatives Institute for Research and Innovation

Englewood

www.chiresearch.org

Founded by Catholic Health Initiatives (CHI) in 2007, the CHI Institute for Research and Innovation partners with CHI hospitals and physicians to further the advancement of healthcare. From pioneering new models of care delivery to creating partnerships within and outside of CHI, CIRI provides a research community fostering innovation in three distinct areas:

- Center for Clinical Research (CCR): Sustaining clinical research and trials is costly and challenging. By creating a national model that uses standardized procedures, policies and IT infrastructures, CCR efficiently and effectively manages clinical trials across CHI's hospital network.
- Center for Health Care Innovation (CHCI): CHCI pioneers new ways to deliver health care. This center is focused on creating and testing new models that will enhance care and better manage populations.
- Center for Translational Research (CTR): The emerging and revolutionary field of biomedicine and genomics is the focus of CTR.

Centers for Disease Control and Prevention/ Division of Vector-Borne Infectious Disease

Fort Collins

www.cdc.gov/ncezid/dvbid

The Division of Vector-Borne Infectious Diseases (DVVID) is part of the U.S. Centers for Disease Control and Prevention (CDC). CDC is the lead federal agency for protecting the health and safety of people at home and abroad. DVVID serves as a national and international reference center for vector-borne viral and bacterial diseases, such as West Nile virus, Lyme disease, plague, tularemia, yellow fever and dengue. It coordinates national disease monitoring activities, conducts field and laboratory research, responds to epidemic situations, develops strategies for disease prevention and control, provides diagnostic reference and epidemiologic consultation, and conducts technical assistance and professional training activities.

Children's Hospital Colorado

Aurora

www.childrenscolorado.org

Children's Hospital Colorado has been ranked for more than a decade as one of the best children's hospitals nationally in U.S. News & World Report, and as the consistent choice eight years in a row by area physicians for the care of their loved ones. Founded in 1908, Children's Colorado is a private, not-for-profit pediatric health-care network dedicated 100 percent to caring for kids. With 1,130 pediatric specialists and more than 2,300 full-time employees, Children's Colorado is home to a number of nationally and internationally recognized medical programs.

C Colorado Center for Drug Discovery (C2D2)

Fort Collins

www.c2d2.org

A non-profit organization funded through the State of Colorado. The organization promotes drug discovery research with Colorado through a combination of funding, medicinal chemistry and modeling expertise.

C Colorado School of Mines

Golden

www.mines.edu

A public research university internationally recognized for its leadership in engineering, applied science and related disciplines, with a special emphasis on the Earth and its resources. These programs, with strong interdisciplinary linkages across the campus, have led to the integration of bioscience and biotechnology into educational and scholarly activities. CSM has created a Bioengineering and Life Science Program that draws upon faculty and students from all of the academic units.

C Colorado State University

Fort Collins, Pueblo, Denver

www.colostate.edu

As one of the nation's leading research universities, Colorado State University is committed to realizing its vision as a 21st century land-grant university. CSU leads the world in such areas as infectious disease research, atmospheric science and environmental science. Its faculty members are tackling such issues as the reemergence of tuberculosis, the brown cloud of air pollution in Asian cities, severe weather forecasting, nutrition and wellness, and bioterrorism. In addition to its excellent programs in those areas, CSU offers among the very best professional programs in

the United States in areas like veterinary medicine, occupational therapy, journalism, agriculture and construction management. Its programs in the arts, humanities and social sciences are also outstanding.

C CSU Research Innovation Center

Fort Collins

www.csuric.org

The Research Innovation Center (RIC) serves as a vehicle to perform collaborative translational-stage research with CSU's life sciences community of researchers, giving it the promise to become the birthplace of medical breakthroughs.

Community College of Aurora (CCA)

Aurora

www.ccaurora.edu

CCA provides lifelong educational opportunities, prepares the current and future workforce, and promotes excellence in teaching, learning and service. CCA offers a unique Biotechnology Technician Research and Development Certificate designed to train highly skilled lab personnel for the biotech industry.

C Colorado Institute for Drug, Device and Diagnostic Development (CID4)

Aurora

www.cid4.com

CID4 provides management expertise to efficiently transform emerging life science technologies into commercial successes. We do this by identifying and funding potential opportunities, and by utilizing an advanced leadership team to ensure speed to market, putting new products and services to work where they are needed.

C Denver Botanic Gardens

Denver

www.botanicgardens.org

One of the top-ranked botanical gardens in the US, Denver Botanic Gardens offers spectacular plant displays and unlimited opportunities for lifelong learning.

C Denver Museum of Nature and Science

Denver

www.dmns.org

The Denver Museum of Nature & Science is the Rocky Mountain region's leading resource for informal science education. A variety of exhibitions, programs, and activities help Museum visitors experience the natural wonders of Colorado, Earth, and the universe.

C Denver School of Science and Technology

Denver

www.dsstpublicschools.org

DSST Public Schools transforms urban public education by eliminating educational inequity and preparing all students for success in college and the 21st century. By creating a powerful learning community centered on core values and a shared commitment to academic excellence, DSST will double the number of college ready graduates in the Denver Public School system by 2020. Over the past decade, DSST has become one of the leading open enrollment STEM schools (Science, Technology, Engineering and Mathematics) in the U.S. and has become a destination for educators nationwide.

Denver Research Institute

Denver

denver-research.org

Denver Research Institute (DRI), founded in 1997, serves as the non-profit organization affiliated with the VA Eastern Colorado Health Care System. It is dedicated to research and its associated educational and scientific endeavors.

Front Range Community College

Brighton, Fort Collins,

Longmont and Westminster

www.frontrange.edu

Front Range Community College, Colorado's largest community college, provides instruction, in both general education and occupational areas, which may lead to a certificate, an associate degree, or transfer to a four-year institution. The college also provides college preparatory education, non-credit instruction for personal and professional development, and workplace skill development. With campuses located in Fort Collins, Longmont and Westminster, the college is proud of its many partnerships to provide quality programs that are responsive to the needs of its local communities.

C Keystone Symposia on Molecular and Cellular Biology

Silverthorne

www.keystonesymposia.org

A non-profit organization that serves as a catalyst for the advancement of biomedical and life sciences by connecting scientists within and across disciplines at conferences and workshops held at venues that create an environment conducive to information exchange, generation of new ideas, and acceleration of applications that benefit society.

C = CBSA Member

National Institute of Standards and Technology (NIST)

Boulder

www.nist.gov

NIST is a non-regulatory federal agency that operates eight different science and advanced technology research divisions in Colorado. NIST's list of research accomplishments includes a NIST senior scientist winning the Nobel Prize in 2001 for creating the world's first "Bose-Einstein condensate." In 2003 another NIST scientist won a MacArthur Fellowship for discovering a new quantum gas and was named by Science as one of the top ten scientific advances of the year.

C National Jewish Health

Denver

www.njhealth.org

National Jewish Health, the nation's #1 respiratory hospital in the US, attracts thousands of adult and pediatric patients each year who come to us to team up with our expert physicians and researchers and seek treatment for respiratory, cardiac, immune and related conditions. National Jewish Health is also one of the most influential independent biomedical research centers in the world. More than 100 faculty members conduct basic, translational, and clinical research in immunology, respiratory medicine, allergy, cancer, and cell and molecular biology. National Jewish Health ranks among the top ten percent of all institutions for NIH support and for the impact of its research papers in the fields of Molecular Biology, Genetics, and Biology and Biochemistry.

National Renewable Energy Laboratory Golden

www.nrel.gov

The nation's primary laboratory for renewable energy and energy efficiency research and development (R&D). NREL's mission and strategy are focused on advancing the U.S. Department of Energy's and our nation's energy goals. NREL's R&D areas of expertise are: renewable electricity (solar, wind, biomass, geothermal), renewable fuels (biomass, hydrogen), integrated energy system engineering and testing (buildings, electric systems and transportation infrastructures), and strategic development and analysis (economic, financial, and market analysis, planning and portfolio prioritization).

C Power Mountain Engineering, Inc.

Fort Collins

powermountainengineering.org

Nonprofit afterschool program for gifted and talented students in grades 8-12 who are interested in a STEM career. Students meet with community volunteers for an entire semester to design and build an advanced project from raw materials. The program encourages our best students to take up college studies in STEM by immersing them in an authentic, hands-on R&D experience.

C Regis University

Denver

www.regis.edu

The School of Pharmacy aspires to be the foremost school of pharmacy in the United States where students are nurtured and developed to become leaders in pharmacy practice, research, education, and public service. As a result, students graduate as professionals who are knowledgeable, skillful, and principled, and who are able to make a positive impact on the dramatically changing role of pharmacists in our transforming society. They are educated to be committed to excellence in healthcare, evidenced not only by their knowledge and abilities, but also by their quality of care, integrity, compassion, respect, advocacy, initiative, service and leadership. To achieve these goals, faculty members are dedicated to providing innovative practice models, exploring novel applications of basic and clinical research, and illustrating the value of lifelong learning.

C Rocky Mountain Innosphere

Fort Collins

www.rmi2.org

At Rocky Mountain Innosphere (RMI), we are helping new clean energy, technology and scientific startup companies turn their great ideas into great businesses. These businesses, in turn, create high wage job opportunities for the community and fuel the growth of the industries of the future.

Rose Medical Center

Denver

www.rosemed.com

Has earned a reputation as Denver's "Baby Hospital" while becoming a leader in comprehensive women's services, internal medicine, endoscopy, heart and vascular care, orthopedics and total joint replacement, bariatric surgery, sports medicine and aesthetic surgery.

Rocky Vista University College of Osteopathic Medicine (RVUCOM)

Parker

www.rockyvistauniversity.org

Rocky Vista University College of Osteopathic Medicine (RVUCOM) is one of the newest of the 28 colleges of osteopathic medicine currently established or in development in the United States. With five departments – biomedical sciences, structural medicine, primary care, Osteopathic Principles and Practices, Specialty Medicine and Medical Informatics the faculty and staff of RVUCOM are committed to osteopathic philosophy and heritage, and to advancing the science and the art of the practice of osteopathic medicine.

Scientific Education & Research Institute (SERI)

Thornton

www.theseri.com

SERI is a unique institute, which combines an orthopedic clinic, specializing in spine surgery, with a clinical research unit and education and training program. Our facility has available to rent an amphitheater with full AV setup for presentations, as well as a bioskills lab with cadaveric dissection capabilities. We host a variety of educational programs including summer science camps. Additionally we host a large number of training programs sponsored by surgical and medical companies.

Swedish Medical Center

Englewood

www.swedishhospital.com

Level I Trauma Center, serves as the region's referral center for neurotrauma and is a recognized leader in the treatment of stroke. An acute care hospital with 368 licensed beds.

United States Geological Survey (USGS) - Center for Biological Informatics

Denver

biology.usgs.gov/cbi/

The Center for Biological Informatics, at the Denver Federal Center, operates the national Biological Information Infrastructure (NBII). This is the first comprehensive electronic gateway dedicated exclusively to biological science data and information from sources throughout the world.

C University of Colorado

Boulder, Denver, Aurora, Colorado Springs
www.cu.edu

The University of Colorado System's 52,000 students and 28,000 faculty and staff contribute to every facet of life in Colorado. The state's economic vitality, educated workforce, entrepreneurial climate, cultural capital, health care delivery, and scientific explorations all rely on the driving force of a vigorous state university. By working with other CU academic and research units, as well as local, state, and federal funding agencies, commercial business, and nonprofit organizations, CU is creating a collaborative synergy in important areas that will better the wellness of society. The CU Institute of Bioenergetics, the Colorado Initiative in Molecular Biotechnology, the Center for Computational Biology, and the Center for Pharmaceutical Biotechnology attract intellectual strength to Colorado, provide new educational opportunities, and inspire innovative health care advances. Research and teaching hospitals affiliated with the University of Colorado include: The University of Colorado Hospital, The Children's Hospital, National Jewish Medical and Research Center, Denver Health and the VA Medical Center.

C University of Colorado Cancer Center

Aurora

www.uch.edu/colorado-cancer-center

The University of Colorado Cancer Center is Colorado's only National Cancer Institute-designated consortium comprehensive cancer center. The center is a consortium of three state universities, including the University of Colorado-Boulder, University of Colorado Denver and Colorado State University, and six institutions (University of Colorado Health, a network comprised of University of Colorado Hospital, Poudre Valley Hospital, Medical Center of the Rockies and Memorial Hospital; Children's Hospital Colorado; Denver Health, Denver VA Medical Center, Kaiser Permanente Colorado and National Jewish Health).

C University of Colorado Health

Loveland, Fort Collins, Colorado Springs
www.pvhs.org

Poudre Valley Health System (PVHS) and the University of Colorado Hospital (UCH) finalized a joint operating agreement in early 2012 that creates a health system its leaders say will widen health care services and provide unparalleled patient care in the Rocky Mountain region. Called University of Colorado Health, the new system combines one of the top-performing community health systems in the nation with the highest-ranked academic medical center in quality in

the country. With annual net revenue of \$1.5 billion, it will be one of the region's largest locally-owned health systems and, with nearly 10,000 employees, one of Colorado's largest employers.

C University of Denver

Denver

www.du.edu

Strives to provide the most modern educational and research facilities in the life sciences. Their history spans the Denver Research Institute's development of the first NASA life monitoring sensors, the establishment of a state-of-the-art forensics laboratory, to the 2003 acquisition of the Eleanor Roosevelt Institute with pioneering efforts in genomics and bioinformatics. In 2004, the School of Engineering and Computer Science unveiled Colorado's first undergraduate program in Bioinformatics and a master's degree in Bioengineering. The interdisciplinary mission of the University enabled the Department of Biology to launch new emphases in Bioengineering, Biophysics and Cognitive Neuroscience designed for molecular biology majors. In addition to strong and quality curricula, bioengineering and life sciences at DU carry multimillion-dollar-a-year research studies in the creation of new knowledge and leading edge biotechnologies to improve quality of life for a worldwide community.

C University of Northern Colorado

Greeley

www.unco.edu

University of Northern Colorado (UNC) is a multipurpose institution with a wide range of graduate and undergraduate programs. The university's mission is to prepare individuals for advanced study, professional careers, and positions of leadership. Work, Education and Lifelong Learning

C Work, Education and Lifelong Learning Simulation (WELLS)

Aurora

www.wellssimulationcenter.org

For the first time in Colorado, one facility offers a complete array of state-of-the-art patient simulation tools for building clinical knowledge. Even more exciting, high-speed datacasting technology makes this unique resource available remotely. Students, faculty and practicing nurses and physicians from throughout Colorado can enhance their diagnostic and clinical skills at the WELLS Center either on-site or on-line. Housed in the new Bioscience East building at Fitzsimons, the WELLS Center represents a unique collaboration among educators, providers and policymakers.

MEMBER FOUNDATIONS**Boettcher Foundation**

Webb-Waring Biomedical Research Program
Denver

www.boettcherfoundation.org

Founded by the Boettcher Family in 1937 to effectively assist, encourage and promote quality of life for the citizens of Colorado, the Boettcher Foundation invests in education, community services, health, and arts & culture through merit awards, scholarships and capital grants. In 2008, the Webb-Waring Institute became a part of the University of Colorado and is now known as the Webb-Waring Center.

The Boettcher Foundation was entrusted with the stewardship of the Webb-Waring Foundation's assets. Through an innovative agreement between the Boettcher Foundation, the Webb-Waring Foundation and the University of Colorado, a new funding area was established at the Boettcher Foundation that supports the work of early-career investigators in the biomedical sciences in Colorado.

CSU Ventures, Inc.

Fort Collins

www.csuventures.org

CSU Ventures, Inc. (CSUV) is a 501(c)(3) non-profit corporation that actively supports and promotes the transfer of Colorado State University (CSU) research and innovations into the marketplace for the benefit of society. CSU Ventures serves CSU faculty and researchers who wish to protect and license intellectual property; builds relationships with industries and investors seeking to engage with CSU; and leverages CSU innovation to foster business formation and enhance regional economic vitality.

University of Colorado Foundation

Boulder

www.cufund.org

The University of Colorado Foundation is a privately governed nonprofit corporation whose mission is to support the University of Colorado. As a valued and trusted partner, the University of Colorado Foundation generates the private support needed in perpetuity for CU to achieve international preeminence as a public research university. Our donors enable CU to reach its full potential to transform lives world-wide through education, research, clinical care and community service.

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MEMBER SERVICE PROVIDERS

Clean Room Services

CO2Nexus, Inc.

www.co2nexus.com

Western States Sales, Inc.

www.CleanRoomWorld.com

Construction and Facilities

CH2M Hill

www.ch2m.com

CRB Engineers and Builders

www.crbusa.com

Facility Planning Arts

www.planningartsinc.com

Howell Construction

www.howellconst.com

Consulting - General Business

Neil Burris & Associates

neil@sssnpartners.com

Consulting - Regulatory, Commercialization and Development

Clinipace Worldwide

www.clinipace.com

Dohmen Life Science Services

www.dohmen.com

Emerson Consultants, Inc.

www.emersonconsultants.com

Evolve Biosciences, LLC

www.evolvebiosciences.com

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Contract Research Organizations

CBR International Corporation

www.cbrintl.com

CARE Research, LLC/Colorado Histo-Prep

www.histoprep.com

CPC Clinical Research

www.cpcmed.org

DaVita Clinical Research (DCR)

www.davitaclinicalresearch.com

High Quality Research, LLC (HQR)

www.hqrlc.com

LABS, Inc.

www.labs-inc.org

Microbial Research, Inc.

www.microbialresearch.com

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PCM Trials

www.pcmtrials.com

Plato BioPharma, Inc.

www.platobiopharma.com

Premier Laboratory, LLC

www.premierlab.com

Pre-Clinical Research Services, Inc.

www.preclinicalresearch.com



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Osteoarthritis	Pharmacokinetics
	(PK/PD/TK)

www.PreClinicalResearch.com

Pyxant Labs, Inc.

www.pyxant.com

West Coast Clinical Trials (WCCT) Global

www.wcct.com

Contract Manufacturing/ Design Organizations

Ashok Dhruv, LLC

www.productivityandgrowth08.com

E2i

www.e2i.net

Evergreen Research, Inc.

www.evergreenresearch.com

Mountainside Medical

www.mountainsidemed.com

Vention Medical

www.ventionmedical.com

Distribution, Packaging and Sales Force

XPO Global Logistics

www.xpologistics.com

Pozzetta Scientific

www.pozzettascientific.com

World Courier Inc.

www.worldcourier.com

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Economic Development

Adams County Economic Development, Inc. (ACED)

www.adamscountyed.com

Aurora Economic Development Council

www.auroraedc.com

Boulder Economic Council of the Boulder Chamber

www.bouldereconomiccouncil.org

Broomfield Economic Development Corporation

www.broomfieldedc.com

Colorado Office of Economic Development and International Trade (OEDIT)

www.advancecolorado.com

Colorado Springs Regional Business Alliance

www.coloradospringsbusinessalliance.com

Jefferson County EDC

www.jeffco.org

Metro Denver Economic Development Corporation

www.metrodenver.org

South Metro Denver Chamber of Commerce

www.bestchamber.com

Town of Parker

www.parkeronline.org

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Finance, Investment and Export Services

AEA Advisors Ltd

www.aeadvisors.com

Capital Rx Consulting

www.capitalrxconsulting.com

CBIZ

www.cbiz.com

Conafay Group

www.conafaygroup.com

EKS&H (Ehrhardt Keefe Steiner & Hottman)

www.eksh.com

EY

www.ey.com

High Country Venture LLC

www.coloradofund1.com

Independent Investment Research

www.independentresearch.com.au

MDAC, LLC

www.mdacllc.com

Morgenthaler Ventures

www.morgenthaler.com

Silicon Valley Bank (SVB Financial Group)

www.svb.com

Stonecroft Capital, LLC

www.stonecroftcapital.com

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Incubator

Colorado Springs Technology Incubator (CSTI)

www.cstionline.org

Fitzsimons Life Science District

www.FitzScience.com

Innovation Center of the Rockies

www.innovationcenteroftherockies.com

Rocky Mountain Innosphere

www.rmi2.org

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Insurance

USI Colorado, LLC

www.usi.biz

CoBiz Insurance, Inc.

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ADInstruments, Inc.

www.adinstruments.com

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Legal Services

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www.cooley.com

Collective IP

www.collectiveip.com

Dorsey & Whitney, LLP

www.dorsey.com

Faegre Baker Daniels, LLP

www.faegrebd.com

Flatirons Legal, LLC

www.flatironslegal.com

Greenberg Traurig, LLP

www.gtlaw.com

Gross Cutler Sieler Dupont

www.gcsdlaw.com

HolzerIPLaw, PC

www.HolzerIPLaw.com

Polsinelli

www.polsinelli.com

Sage Law Group

www.sagelawgroup.com

Sheridan Ross, PC

www.sheridanross.com

Snell & Wilmer
www.swlaw.com

Swanson & Bratschun
www.sbiplaw.com

Marketing, Communications,
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Absolutely Public Relations
www.absolutelypr.com

Aegis Creative
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Burns Marketing Communications
www.burnsmarketing.com

Business Wire
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Global Prairie
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Growl Healthcare Agency
www.GrowlAgency.com

KP Corporation
www.kpcorp.com

Planning Partners International, LLC
www.ppimeetings.com

Sprint Press
www.sprintdenver.com

Ubiquity Group
www.ubiquitygroup.com

Events/Hotel

Woolley's Classic Suites Hotel
www.woolleysclassicsuites.com

Public Policy

Advanced Medical Technology Association (AdvaMed)
advamed.org

Biotechnology Industry Organization (BIO)
www.bio.org

PhRMA
www.phrma.org

We Work for Health
www.weworkforhealth.org

Real Estate

Avison Young
www.avisonyoung.com

EcoSpace Commercial
ecospacecommercial.com

Fitzsimons Life Science District
www.colobio.com

Forte Commercial Real Estate
www.fortecre.com

Jones Lang LaSalle
www.joneslanglasalle.com

Recruiting, Placement,
and Workforce

Aerotek, Inc.
www.aerotek.com

Kelly Scientific Resources
www.kellyscientific.com

Lab Support
www.labsupport.com

Supplier/Equipment/
Disposal-Lab

Colorado Medical Waste, Inc.
www.coloradomedicalwaste.com

Thermo Fisher Scientific, Inc.
www.thermofisher.com

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Technical Safety Services
www.techsafety.com

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