

Fueling Colorado's Biotech Boom

Technology Transfer Takes Innovation from Lab to Market

With over \$500 million in annual life science research activity, Colorado's institutions provide a substantial pipeline for new technologies.

By Jon Pushkin

Technology transfer helps universities and research centers "transfer" their innovations from the lab to the marketplace. It allows them to license the technology to secure the investment dollars and means to commercialize the discovery.

Across the state, in university labs and public research institutions, Colorado's technology transfer wizards are helping scientists bring their discoveries to life. It's a dynamic combination that is just beginning to take off.

University of Colorado (CU)

Tech transfer is a high priority at CU. The university provides the resources to identify, protect, package, and license the intellectual property resulting from the research process. From advising faculty on IP issues to fostering inventor participation in the tech transfer process, CU educates campus researchers about tech transfer, solicits and analyzes invention disclosures from faculty, students, and staff, and analyzes commercialization feasibility of university intellectual property.

David Allen, Associate Vice President for technology transfer at CU, says Colorado must do a better job of creating early stage financing. He points out that California is investing billions in stem cell research, while Colorado is still recovering economically and runs the risk of falling behind.

Allen says that CU's success in discovering new technologies is proof of what can happen when research becomes an institutional priority. Federally funded research at CU increased by 77 percent from 1996-2001, the third highest increase among all U.S. universities.

In the past year, nine bioscience companies spun out of CU research. "Biology is the most common undergraduate science degree," says Allen. "The talent is out there. We just have to provide them with the resources to succeed."

Colorado State University (CSU)

The Colorado State University Research Foundation (CSURF) manages the intellectual property resulting from CSU research. This includes patenting, licensing and marketing technologies; developing close relationships with business and industry; providing support and guidance to startup companies; managing equity positions in startup businesses; evaluating technologies for commercialization potential and matching opportunities for technology development with University research capabilities. CSURF also handles any revenue from technology transfer.



Kathleen Henry, President and CEO of CSURE, says although Colorado receives significant research funding there could still be clearer communication and enhanced cooperation among private industry, universities and research institutions.

Clarifying the rules that govern the use of university facilities by private industry, and providing better defined opportunities on the participation of public university faculty and students in startups would help, she says. She also hopes for more state funding for higher education to help retain top faculty. In addition, "gap" funding is needed to bring the relatively embryonic state of university technology to a level in which it can be more easily commercialized.

CSU receives approximately \$240 million per year in research funding, the third highest total among public universities without a medical school.

National Jewish Medical and Research Center

Founded in 1899, National Jewish Medical and Research Center is the nation's top hospital for treating respiratory diseases. It is the only facility in the world dedicated exclusively to the treatment of patients with respiratory,

immune and allergic disorders, and is in the top five percent of all U.S. institutions for medical research funding from the National Institutes of Health.

The National Jewish tech transfer program facilitates the commercialization of laboratory research in biotechnology, biological materials and biomedical devices. It identifies and protects intellectual property and facilitates business partnerships for collaborative research and technology licensing. National Jewish has nearly 100 technologies in its active portfolio and owns more than 50 issued U.S. patents plus additional corresponding foreign patents.

Brad Brockbank, manager of the National Jewish tech transfer program, sees a large gap between developing an academic innovation and maturing the technology to the point that it becomes attractive to startups. To help bridge that gap, the institution is stepping up its emphasis on translational research, recruiting physician scientists who have a hand in both research and clinical activities, and developing a technology enhancement and commercialization fund to mature their intellectual properties and reduce risks for potential licensees.

AURORA

Bioscience...one of Colorado's leading industries by 2010.

Aurora is home to Fitzsimons, the largest bioscience development in the United States. The 578-acre project is undergoing a \$4.3 billion transformation that will result in approximately 15 million square feet of new construction. These facilities will be used for patient care, education, basic science research, and bioscience research and development. When completed, more than 32,000 professionals will work at Fitzsimons.

The Aurora Economic Development Council is the business and government partnership behind Aurora's unparalleled emergence as the most important city in Colorado's future. Through innovative employer recruiting, expansion and retention initiatives, Aurora EDC is helping build a new regional economic powerhouse representing the state's most promising growth industries, including transportation, biosciences, aerospace, and defense systems.



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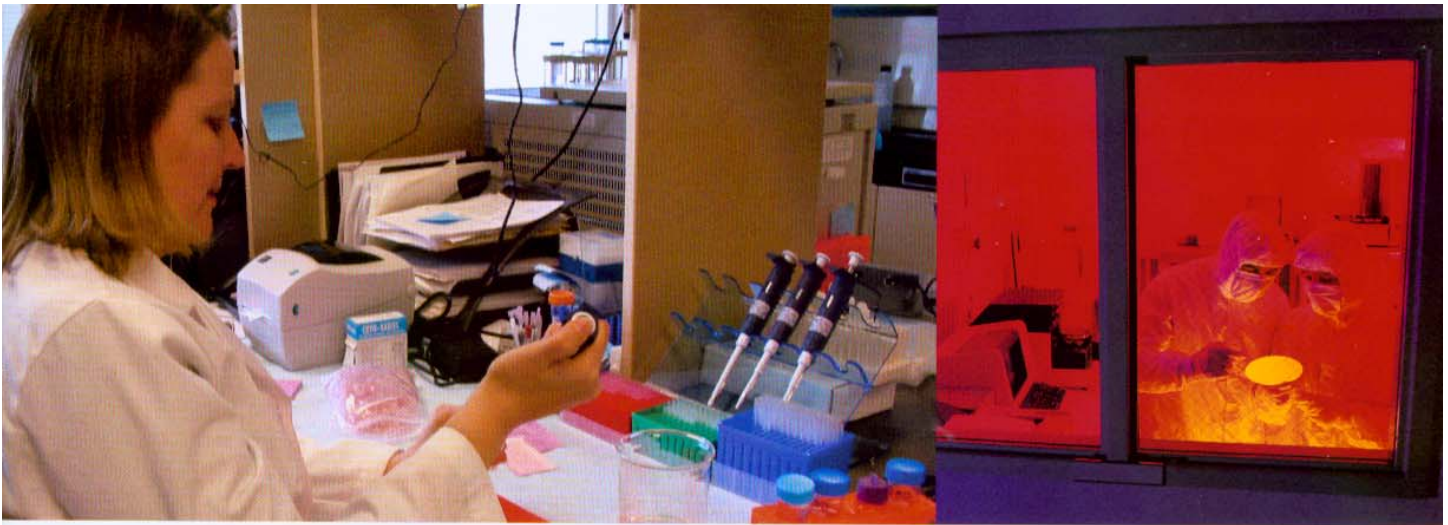


Photo courtesy of Fitzsimons Redevelopment Authority

“Getting academic innovations to startups takes resources and a commitment from the institutions to invest in their own technologies,” says Brockbank. “It takes a shift in vision at the highest levels of the institution regarding its mission in the community.”

National Renewable Energy Laboratory

The National Renewable Energy Laboratory (NREL) in Golden, part of the U.S. Department of Energy, is the nation’s primary laboratory for renewable energy research.

NREL receives about \$210 million annually in R&D funding, about half of which is spent at its Colorado lab. Additional grant money is distributed to universities and private companies in Colorado and nationally.

Turning biomass materials into renewable energy is one of NREL’s primary projects. Biomass is plant matter such as trees, grasses, agricultural crops or other biological material. It can be used as a solid fuel, or converted into liquid or gaseous forms for the production of electric power, heat, chemicals, or fuels. Biomass offers an exciting opportunity to replace imported oil with renewable, domestically produced transportation fuels.

Tom Williams, director of NREL’s technology transfer office, says partnerships create market opportunities. “Our mission is built on seeing our technologies commercialized,” says Williams. “We tailor our collaborations based on the needs of the company and the market demands.” Industry partnerships may include collaborative development, technology licenses, and the use of NREL facilities. Recent NREL partnerships include a licensing agreement with DuPont to convert biomass-derived starches and sugars to ethanol, and efforts to support a local startup company, Community Power Corporation, to develop modular biomass systems for distributed energy needs.

Williams sees a huge opportunity for growth in renewable energy. “All the seeds are here to drive the market,” says Williams. **“High fossil fuel prices, concern about global climate change, and our growing reliance on foreign oil are creating a new urgency to change our energy sources.** Biomass fuels are an important part of the solution, and other renewable sources such as wind and solar are already seeing double digit market growth rates.” ♦

COLORADO SPINOUTS

Tech transfer “spins out” innovations from the lab to the marketplace. Recent examples include:

Taligen spun out of the University of Colorado. It employs novel technology to manipulate the immune system to inhibit inflammation and to target inhibitors of inflammation to specific sites of tissue injury.

Keen Ingredients uses technology developed at Colorado State University, including a unique plant protein that has the nutritional quality of animal protein.

MicroPhage is based on technology from the Colorado School of Mines. It develops high-speed bacteria detection technologies for use in food safety, environment contamination, evaluation of infectious agents in humans and animals, industrial pathogens, and biological warfare threat agents.