



Venture Partners

UNIVERSITY OF COLORADO **BOULDER**

TRANSLATING INNOVATION

Driving Impact

2022 ANNUAL REPORT



A Groundbreaking Innovation Pipeline

Measuring Impact in FY 2022

\$2.4B

TOTAL MARKET CAP OF THE TWO PORTFOLIO COMPANIES THAT WENT PUBLIC

\$337M

CAPITAL RAISED BY 15 PORTFOLIO COMPANIES

87

LICENSE AND OPTION AGREEMENTS, AN ALL-TIME RECORD AND 61% INCREASE OVER THE FIVE-YEAR AVERAGE

55

I-CORPS™ TEAMS TRAINED

2022 WAS ANOTHER TREMENDOUS YEAR FOR INNOVATION AT CU BOULDER. Campus researchers and inventors created a strong crop of 145 breakthrough technologies this past year. These spanned the breadth of CU Boulder’s research expertise, with innovations in climate tech, biotechnology, quantum science, optics and aerospace, to name a few.

The mission of Venture Partners at CU Boulder is to catalyze the translation of research into successful commercial ventures. In 2022, we executed 88 license and option agreements to partner CU Boulder technologies with commercial businesses, including 12 newly formed startup companies we helped create. Our startup portfolio raised \$337 million in new capital over the past year. Two of our spinout companies, SomaLogic and Solid Power, went public in 2022; each listed on the NASDAQ with an opening valuation of more than \$2 billion.

Venture Partners is driving a shift in how university innovations can achieve market success. CU Boulder is a place where creative problem solvers are well-resourced to transform their innovations into new businesses. Our suite of programs and partnerships address the challenges of entrepreneurship within scientific and engineering fields.

Many long-planned initiatives came to fruition in 2022. We joined our partners at the University of Southern California and the University of California at Los Angeles to launch the I-Corps™ Hub West Region, a program that trains researchers in fundamental principles of entrepreneurship. We ran the first-ever cohort of Ascent, CU Boulder’s new accelerator for deep tech startups. In an exciting development, we helped create and partnered with Buff Venture Fund, the first venture capital fund dedicated to investing in CU Boulder startups. Looking ahead to 2023, we will continue to grow our ecosystem with Embark, a program that connects experienced startup executives with world-class innovations and seed funding to launch new companies.

Our work creates a positive impact on society. In materials science, recent CU Boulder spinouts Tynt Technologies and Prometheus Materials are addressing climate change by tackling energy loss from building windows and the massive carbon emissions in concrete production. In the domain of health and wellness, startups Xalud Therapeutics and OnKure Therapeutics are combatting chronic pain and cancer in late clinical trials.

At the level of economic impact, a 2022 report from the Leeds School of Businesses measured CU Boulder’s commercialization impact on the national economy at \$8 billion over the past five years. University research holds the potential to transform lives and address the world’s greatest challenges. It is our responsibility and privilege to help ensure this potential is realized.

We would like to express our gratitude to the many people and partners who made this such a successful year at Venture Partners. To the many talented and dedicated researchers at the university—our faculty, graduate students and professional research staff—we are continually inspired by your creativity and expertise and appreciate your collaboration. To our close partners in the local and national innovation ecosystems—entrepreneurs, investors, corporate partners and governmental agencies—we are grateful for your continued support and partnership. To our mentors, your volunteer time and expertise are invaluable to our work. Finally, to the dedicated and talented team members at Venture Partners, who support CU Boulder in its place as a national leader, you are a source of innovation and a force for hope and progress in the world.



Bryn Rees
Associate Vice Chancellor for Research and Innovation;
Managing Director of Venture Partners at CU Boulder



Massimo Ruzzene
Acting Vice Chancellor for Research and Innovation;
Dean of the Institutes

Shown on cover (from top): Wil V. Srubar, PhD (Materials Science & Engineering) holds a sample cube of concrete that contains biogenic limestone; researchers at CU Boulder’s BioFrontiers Institute; Assistant Professor Laurel Hind (Chemical and Biological Engineering) and graduate student Tanisha Kaur.

Venture Partners at CU Boulder translates breakthrough research into economic and societal impact.

We equip researchers to commercialize lab discoveries with real-world insights. Our programs and processes move at a rapid pace to bring world-changing innovations from CU Boulder to the market.



A LongPath Technologies technician inspects a high-tech laser at a natural gas facility in Greeley, Colorado.

Growing Results

We empower the people behind the headline-making breakthroughs. Our approach supports long-term commercial success. The proof is in our results.

FY 2022

145
INVENTIONS

87
LICENSES & OPTIONS

12
STARTUPS

FY 2021

130
INVENTIONS

65
LICENSES & OPTIONS

20
STARTUPS

FY 2020

175
INVENTIONS

59
LICENSES & OPTIONS

12
STARTUPS

FY 2019

144
INVENTIONS

46
LICENSES & OPTIONS

6
STARTUPS

FY 2018

187
INVENTIONS

52
LICENSES & OPTIONS

7
STARTUPS

FY 2017

124
INVENTIONS

49
LICENSES & OPTIONS

9
STARTUPS

FY 2012-2016 (AVERAGE)

109
INVENTIONS

33
LICENSES & OPTIONS

5
STARTUPS

Leading Nationwide Impact

Economic Impact Report 2018-22

Commercialization activities led by Venture Partners at the University of Colorado Boulder had an economic impact of \$8 billion nationally and \$5.2 billion in the state of Colorado over the last five years, according to a new report from the Leeds School of Business, a four-fold increase in impact since the previous report published in 2019.

The study was completed by the Business Research Division of the Leeds School of Business—led by Brian Lewandowski, executive director—which conducts economic impact studies and research projects for the university and local businesses. The report reinforces CU Boulder as a top university for helping researchers establish startup ventures and commercialize new discoveries that have real-world impact. It also underlines commercialization as a significant component of CU Boulder's overall economic impact.

Compared to other universities with at least fifteen startups in fiscal year 2021, CU Boulder produced the most startups after adjusting for university size, according to data from the Association of University Technology Managers, outside of the Leeds report. Venture Partners leads commercialization at the university with a comprehensive approach and suite of programming to guide faculty, researchers and graduate students on the path to commercializing their innovations.

“The university’s role is to support our innovators,” said Bryn Rees, associate vice chancellor for research and innovation. “These are our creative faculty, graduate students and postdocs who are addressing important problems in their research. Commercialization increases CU Boulder’s ability to translate promising discoveries and innovations into real-world solutions.”

CU Boulder startups have been making global news, many from here in Colorado. Solid Power is working to deliver solid-state electric vehicle batteries—first developed at CU Boulder by founders Sehee Lee and Conrad Stoldt, both professors in mechanical engineering—with partners Ford Motor Co. and BMW, out of Solid Power’s 75,000-square-foot plant in Thornton. Boulder-based SomaLogic—founded by Larry Gold, professor of molecular, cellular and developmental biology—went public on the NASDAQ last year and is a leading provider of proteomics technologies globally. The quantum-matter machine “Albert” was named one of TIME’s best inventions of 2022, created by Colorado’s own ColdQuanta—co-founded by Dana Anderson, professor of physics.

The revenues CU Boulder receives from licensing innovations created at the university are reinvested in what Rees calls a “virtuous cycle,” split between the inventors (including their

\$8B
IMPACT ON THE NATIONAL ECONOMY

\$5B
IMPACT ON THE COLORADO ECONOMY

39,000
JOBS NATIONALLY

57
STARTUPS

315
UNIQUE COMMERCIALIZATION AGREEMENTS

\$3B
CAPITAL RAISED BY CU BOULDER STARTUPS

\$45M
COMMERCIALIZATION-SPECIFIC GRANTS

LICENSES AND STARTUPS SPANNED
36 STATES
26 COUNTRIES

research labs) and the commercialization programs run by Venture Partners. “Today, someone wishing to commercialize an innovation at CU Boulder has access to a tremendous amount of support, and they have that because of the past successes of their peers and the reinvestment of the university’s share in that success,” said Rees. “The end result is a greater capacity for CU Boulder to deliver on the promise of breakthrough research to produce new solutions and economic growth.”

Read the full report at colorado.edu/venturepartners/impact2022

Developing Real-World Readiness

Our programs go beyond the traditional technology transfer model to support researchers-turned-founders in scaling successful, sustainable businesses.

Leading a Western Innovation Powerhouse



I-CORPS™ Hub West

A \$15 million National Science Foundation (NSF) award cultivates inventions and ventures in deep technology at research universities in the Western United States. CU Boulder's leadership has brought nationally-recognized instructors, business mentors and further entrepreneurial opportunities into the state of Colorado.

PROGRAM LEADERSHIP

University of Southern California, in partnership with CU Boulder and the University of California-Los Angeles

AFFILIATES

California Institute of Technology, Colorado School of Mines, Colorado State University, University of New Mexico, University of Utah, University of California-Riverside

Destination Startup®

The fourth annual and largest-ever Destination Startup® event attracted 28 startups from ten different institutions across six Rocky Mountain states in 2022. Participants pitched to investors and strategic partners from around the world.

INSTITUTIONS REPRESENTED

Colorado School of Mines, Colorado State University, Montana State University, National Renewable Energy Laboratory, University of Arizona, University of Colorado Anschutz Medical Campus, University of Colorado Boulder, University of Nebraska Medical Center

Buff Venture Fund

Launched in 2022, the Buff Venture Fund is a private venture capital fund that invests in startup companies connected to CU Boulder. Venture Partners has a formal partnership with Buff Gold Ventures to grow startup companies and identify investment opportunities collaboratively.

Current investments: Tynt Technologies, Think Bioscience, Vitro3D and LongPath Technologies



“Our first five investments showcase disruptive improvements in cleantech, 3D printing and drug discovery or delivery. Through our investments, we are proud to partner with Venture Partners to build a vibrant, supportive ecosystem for CU.”

— Sally Hatcher and Mark Lupa, Co-Founders and General Partners of Buff Gold Ventures



Twelve teams of University of Colorado faculty, researchers and graduate student innovators competed for a combined \$1.25 million in startup funding grants in this year's Venture Challenge (LVC), funded in part by the Colorado Office of Economic Development and International Trade (OEDIT).

Transforming Innovators into Entrepreneurs



Starting Blocks Customer Discovery Workshop

A three-day workshop with customer interviews designed to help scientists and engineers find a market for their innovations.

APPROACH

This is the shortest, “introductory” version of the National Science Foundation's I-CORPS™ methodology, which helps inventors build a customer discovery toolkit and learn to talk to industry and business funders about their technologies.

READINESS

Participants understand the importance of market discovery, are well-versed in basic business terminology, experience interviewing industry contacts and are prepared to accelerate the commercialization of their invention.

Research-to-Market (R2M) Customer Discovery Program

The four-week program walks technologists through the customer discovery process and pushes them to think about how their innovations can be adopted in markets in consultation with experienced mentors and advisors.

APPROACH

As part of the National Science Foundation's I-CORPS™ Program, R2M leverages the nationally-recognized Lean Startup and Business Model Canvas methodologies.

READINESS

Innovators and technologists are prepared to compete in the Lab Venture Challenge, collaborate with industry partners and secure grants and investments.

Moving at Market Speed



Lab Venture Challenge

CU Boulder's most commercially promising technologies compete to win grants of up to \$125,000 each. Competitors are encouraged to participate in I-CORPS™ customer discovery programs, participate in a pitch academy and work with Venture Partners Entrepreneurs in Residence, staff and mentors before competing. Finalists compete in a live pitch competition with a community audience.

FY22 GRANTS TO WINNING INNOVATORS

Twelve teams won funding; eight received full \$125,000 awards, and four received \$62,500, for a total \$1.25 million split between biosciences and physical sciences teams.

KEY PARTNER

Colorado Office of Economic Development and International Trade (OEDIT)

Ascent Deep Tech Accelerator

Deep tech startups provide a huge opportunity for impact but face unique challenges. They often require more funding and longer lead times to bring products to market. A new accelerator created for CU Boulder deep tech innovators addresses these hurdles.

In 2022, 13 teams spent five months developing their companies and teams, paving a path to market, learning entrepreneurial finance and preparing for fundraising.

TOPICS COVERED

Company formation, team building, path to market, finance, accounting and fundraising

SPECIALIZED CONTENT

Biotech, quantum, energy/cleantech

Celebrating Success:

Key investment is the latest milestone for CU Boulder startup Vitro3D and venture development programming

Vitro3D, a CU Boulder startup pioneering volumetric 3D printing for life sciences, closed its first investment round of \$1.3 million. The vote of confidence from the investment community—including the Buff Venture Fund—will allow the promising new venture to pursue ambitious technical advances while continuing to build critical business capacity.

The company has licensed a portfolio of intellectual property from CU Boulder, based on foundational work developing a novel volumetric 3D printing technology. The approach has potential applications in the dental, medical and drug development industries.

CEO Camila Uzcategui and CTO Johnny Hergert started Vitro3D together when they were PhD students in Professor Bob McLeod's lab in CU Boulder's College of Engineering and Applied Science. They often sat together in class, collaborated on papers and explored innovations with 3D printing. In late 2019, they jointly disclosed their first invention, "Orthogonal 3D control of properties in 3D printed structures," to Venture Partners.

Uzcategui and Hergert saw the potential to print larger and more detailed parts, achieve faster speeds, and reduce cost and waste in 3D printing applications.

At first, Vitro3D explored using the technology to regenerate growth plate tissue for children with growth-threatening long bone injuries by printing structures that could be infilled with cells and hydrogels to recreate cartilage. Through several exploratory Venture Partners programs, it became clear that the marketplace could benefit from their approach, but regulatory hurdles and other market characteristics would prevent the technology from reaching patients for decades.

"We were realizing we had a technology platform that could do many things," said Uzcategui. "The technology development for our original vision could still take place, but we wanted to find a different initial market that would allow us to create our impact faster."

Uzcategui and Hergert dove into market research through Venture Partners' Research-to-Market (R2M) and Starting

Blocks programs, both part of CU Boulder's I-Corps™ West Hub. After conducting more than 150 customer discovery interviews, they were confident they had found their initial market: dental aligners.

Once the company identified the dental market, progress accelerated quickly. Vitro3D gained visibility and accolades in the campuswide Lab Venture Challenge (LVC), drew notice from investors at the CU Boulder-hosted Destination Startup® showcase, and finished as runners-up in the New Venture Challenge. Along the way, the company secured nearly \$450,000 in "non-dilutive" grants—including \$250,000 from the Colorado Office of Economic Development and International Trade (OEDIT)—allowing them to transition off campus by the summer of 2022.

The company has already produced the fastest, largest part ever printed using the volumetric 3D method, but they are just getting started. The funding they've secured has allowed them to hire a senior engineer working to advance the printer's hardware, algorithms and materials to continuously improve the size, speed and quality of printed parts. The team has also hired David Raymes, a client director at Innosphere Ventures, founder of four startups, tech startup advisor and investor, to serve as chief business officer.

With an eye on three distinct markets—first the dental market, then 3D cell culture for drug development and scaffolds for human organ and tissue regeneration—Vitro3D is now equipped to meet the technical goals and grow the business infrastructure needed to achieve real impact for patients.

Read the full story at colorado.edu/venturepartners/news



Camila Uzcategui, PhD and Johnny Hergert, PhD.

Among the opportunities that were most helpful were Venture Partners' Starting Blocks and Research-to-Market (R2M) programs—each a part of CU Boulder's I-Corps™ Hub—and a New Venture Launch class taught by Leeds School of Business Professor Jeff York.

Building New Pathways

Inaugural deep tech accelerator opens new doors and markets for campus startups

Thirteen startup company founders commercializing CU Boulder research innovations received a boost in 2022. Ascent, a startup accelerator specifically created for CU Boulder innovators, wrapped up with its inaugural cohort filled with founders who launched their companies, raised investment capital and gained market and partnership traction. Run by Venture Partners at CU Boulder, Ascent provided a four-month intensive training to the university's entrepreneurial researchers ending with a two-day capstone event in May.

"It was very exciting to see the development and 'aha' moments for the teams during the program. We had program educators covering topics from fundraising and legal to sales management and PR," said Nicole Forsberg, Business Development Executive at Venture Partners. "This was our first cohort, and a 'startup' for us as well, and we are excited to scale this up for future cohorts."

DRILLING DEEP INTO STARTUP TRAINING

Companies that spin innovations out of university labs, sometimes called "deep tech" startups, face unique challenges. Because they disrupt established technologies, these new businesses often require more funding and longer periods to develop and bring their products to market. However, since the upside of breakthrough technology can be so substantial economically and socially (think sustainable energy, personalized medicine and quantum computing), the deep tech startup scene is rapidly growing, including here at CU Boulder. In 2021, the university tallied 20 new deep tech startups.

Venture Partners has designed the Ascent curriculum to meet the special challenges faced by deep tech startups, including those that come with being a founder at a university.

"The startup 'valley of death' feels particularly wide with deep tech companies," said Emily Klein, director of venture development for Venture Partners. "These companies need to validate many milestones, in both their technology and their business planning, before successfully bringing their tech to market."

All participants previously completed prerequisite training in CU Boulder's I-Corps™ program, which helps innovators find market-fit for their innovations. Each participant then utilized this training to continue their startup journey during Ascent with specialized tracks that provide domain-specific content that aligns with company needs.

"Our regional I-Corps™ programs, Starting Blocks and Research-to-Market, support faculty, grad students and deep tech founders in the community in taking their first steps toward product-market fit," said Klein. "Ascent then ties

2022 COHORT MEMBERS

AmplifiedSpace

**Polaris
Electro-Optics**

BAuth

Rigid Biotech

BCOS

Sarus Lifting

Chatizy

**Seedling
Biosystems**

Human Fusions

Latimer Controls

TissueForm

LumenAstra

Vitro3D

together learnings from I-Corps™ into a network of mentors, business specialists and investors to accelerate our teams out of the lab and into the startup world."

CHECKING TEMPERATURE ON THE MARKET AND THE BODY

LumenAstra, a CU Boulder-based team headed by CEO Jim Pollock, joined the program to accelerate an internal core body temperature sensor. Possible applications include direct brain temperature measurement to decrease mortality risk during cardiac bypass surgery and identifying heat stress among athletes and military servicemen. With the toolkit assembled from Ascent, this early-stage company is preparing for FDA certification in 2023 to enter the highly competitive medical device market. While completing Ascent, LumenAstra, along with cohort member Vitro3D and five other campus startups, was awarded \$250,000 from state commercialization grants to support these high-risk investments.

"Thanks to the hard work and determination of all these teams, we are able to see more and more impactful success on Colorado's economy," said Stephen Miller, director of venture development for Venture Partners at the in-person happy hour following the two-day online showcase.

Ascent is an official partnership between Venture Partners and the Colorado Office of Economic Development and International Trade (OEDIT).

Supporting World-Changing Companies

CU Boulder technology has launched more than 155 startups. Here are just a few.



FACULTY FOUNDER: Jerome Fox, PhD (Chemical and Biological Engineering)
FOCUS: Programming microbial systems to discover, build and evolve small-molecule drugs
CEO: Jerome Fox, PhD
RECENT RESULTS
 • Awarded \$250,000 grant by Colorado Office of Economic Development and International Trade (OEDIT)
 • \$17 million raised in Series A round



FACULTY FOUNDER: Michael D. McGeehee, PhD (Chemical and Biological Engineering)
FOCUS: Climate-friendly adaptive window tinting
CEO: Ameen K. Saafir
RECENT RESULTS
 • Awarded \$250,000 grant by OEDIT
 • \$8.5 million raised in Seed round



FACULTY FOUNDER: Robin Dowell, PhD (Molecular, Cellular & Developmental Biology)
FOCUS: Using machine learning and RNA to make drugs for a variety of indications including cancer and inflammation diseases
CEO: Joey Azofeifa, PhD
RECENT RESULTS
 • \$17 million raised in Series A round



FACULTY FOUNDER: Sara Sawyer, PhD (Molecular, Cellular & Developmental Biology)
FOCUS: Saliva-based diagnostics for the early detection of infectious diseases
CEO: Nicolas Meyerson, PhD
RECENT RESULTS
 • Winner of 2022 Colorado Companies to Watch



FACULTY FOUNDER: Gregory Rieker, PhD (Mechanical Engineering)
FOCUS: Emission detection in natural gas operations
CEO: Ian Dickinson
RECENT RESULTS
 • \$29 million raised in Series A round



FACULTY FOUNDER: Milos Popovic, PhD (since departed CU Boulder)
FOCUS: Solving bandwidth and power bottlenecks in computing systems by moving data using light
CEO: Charlie Wuischpard
RECENT RESULTS
 • \$130 million raised in Series C round



FACULTY FOUNDER: Jeffrey Cameron, PhD (Biochemistry); Mija H. Hubler, PhD (Civil, Environmental and Architectural Engineering); Will V. Srubar III, PhD (Materials Science & Engineering)
FOCUS: Using microalgae to reduce and eliminate CO2 from concrete building materials
CEO: Loren Burnett
RECENT RESULTS
 • \$8 million raised in Series A round



FACULTY FOUNDER: Sehee Lee, PhD, Conrad Stoldt, PhD (Mechanical Engineering)
FOCUS: Solid-state electric vehicle batteries with increased range and safety
CEO: Dave Jansen
RECENT RESULTS
 • Went public in 2022 (SLDP)



FACULTY FOUNDER: Larry Gold, PhD (Molecular, Cellular & Developmental Biology)
FOCUS: Health, wellness and disease monitoring through proteomics
CEO: Roy Smythe, MD
RECENT RESULTS
 • Went public in 2022 (SLGC)




FACULTY FOUNDERS: Bob McLeod, PhD (Electrical, Computer & Energy Engineering)
FOCUS: Dental aligner manufacturing through volumetric 3D printing
CEO: Camila Uzcategui, PhD
RECENT RESULTS
 • Closed its first investment round of \$1.3 million


Working with Us

Our team builds connections to commercialize world-changing breakthroughs. We support up-and-coming innovators and develop relationships with industry leaders and investors from across the country.

Leadership


 **Bryn Rees**
 Associate Vice Chancellor for Research and Innovation; Managing Director, Venture Partners at CU Boulder

IP & Licensing


 **Joshua Bennett**
 Licensing Manager, Physical Sciences & Engineering


Venture Development


 **Jeanne Barthold**
 Director, Center for Translational Research


 **Amy Dodenhoff**
 Licensing Manager, Physical Sciences & Engineering Director, Lab Venture Challenge


 **Mackendy Blanc**
 I-Corps™ Program Coordinator


 **Kate Havey**
 Senior Licensing Manager, Physical Sciences & Engineering—Chemistry/Chemical Engineering/Materials Sciences


 **Nicole Forsberg**
 Business Development Executive


 **Jonathan Marenus**
 Licensing Analyst

 **Emily Klein**
 Director of Venture Development

 **Hannah Nelson**
 Senior Licensing Manager, Biosciences

 **Daniel Marshall**
 I-Corps™ Program Manager

 **Annalissa Philbin**
 Senior Associate University Counsel


 **Stephen S. Miller**
 Director of Venture Development


 **Marta Zgagacz**
 Director of Licensing

Venture Fellows

 **Justin Stitzlein**


Administration, Communications & IT

 **Nathan Chen**
 Senior ERA Application Administrator


 **Tasso von Windheim**


 **Joe Davidek**
 Patent Manager

Entrepreneurs in Residence (EIRs)

 **Zamira Gleason**
 Administrative Coordinator

 **Jon Shapiro**

 **Daniel Leonard**
 Senior Marketing & Communications Specialist

 **Susan Strong**

 **Lynn Pae**
 License Administrator

Supporting Startup Success

Our team works closely with innovators to commercialize cutting-edge science. Together, we shape discoveries, identify opportunities and determine how to develop the final product, service or solution to appeal to target markets.



Intellectual Property (IP) Management

Protecting compelling and transformative innovations and technologies



Funding

Offering translational and proof of concept grants, and helping innovators and startups obtain capital to advance technologies and startups



Entrepreneurial Training

Providing innovators and startups with commercialization tools and resources



Licensing & Industry Partnerships

Providing business-friendly licensing, and bringing world-class research to consumer markets



Mentorship & Advising

Coaching innovators and startups on pathways to commercialization



Elliot Strand, a PhD student (Materials Science & Engineering), tests an ion-selective organic electrochemical transistors that can detect macronutrient concentrations.



Venture Partners

UNIVERSITY OF COLORADO **BOULDER**

4845 Pearl East Circle, Suite 300
588 UCB
Boulder, CO 80309

VPCONTACT@COLORADO.EDU
FAX: 303-860-6211