

# GRANT PROGRAMS: Innovation Engines

**T**HE GROWTH AND SUCCESS OF COLORADO'S LIFE SCIENCE ECOSYSTEM would not be as robust as it is today without some valuable assistance from the state's Advanced Industries (AI) Accelerator Grant Program. Initiated in 2006, and known as the Bioscience Discovery Evaluation Grant Program (BDEG), Colorado recognized the need to support the development of its novel technologies and make an effort to advance commercialization. The program's success led to the passage of additional legislation in 2013, enacting the AI Accelerator Grant Program we know today.

Since its inception, the state's Advanced Industry Grant Program has awarded **333 grants** to bioscience companies, totaling more than **\$45 million**, creating **56 new companies**, **597 direct jobs**, and **\$530 million** in follow-on grants and investments.

The AI Accelerator Grant Program promotes growth and sustainability in Colorado's seven advanced industries – advanced manufacturing, aerospace, bioscience, electronics, energy, infrastructure engineering and technology – by helping drive innovation, accelerate commercialization, encourage public-private partnerships, increase access to early stage capital and create a strong ecosystem that increases the state's global competitiveness.

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## The AI Accelerator Grant Program offers three grant types:



### Proof of Concept Grants

Identify and pull technologies from research institutions where they were discovered and connect them to the private sector, where they can be developed into products for commercialization.



### Early-Stage Capital & Retention Grants

Fund companies using technologies developed in proof-of-concept grants and other early-stage start-ups that have created viable products that meet a market need and that can be created or manufactured in Colorado and exported globally.



### Infrastructure Funding Grants

Used to accelerate commercialization and innovation of AI products and services by building capacity and workforce for the AI ecosystem.

In addition, the AI Export Grant Program supports many small and medium-sized businesses in the advanced industries, and offsets international business development and related marketing costs.

These 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 by Institution

Investigator: Adam Heuberger  
Institution: Colorado State University  
Title: A Molecular Approach to Improve Flavor Stability in Beer  
Impact: This technology consists of using gene sequences in yeast to alter chemical events that occur during brewing and provide novel utility by inhibiting chemical reactions that occur during storage that affect the quality characteristics of beer.

Investigator: Leslie Stone-Roy  
Institution: Colorado State University  
Title: Audio Lingual Device (Smart Mouthware)  
Impact: A tongue-based device that converts audio sounds into electrical signals. This allows the tongue to augment or replace audio sensations via a new paradigm. The technology is being commercialized by Sapien LLC.

Investigator: Charles Henry  
Institution: Colorado State University  
Title: Low-Cost Sensor for Rapid Virus Detection  
Impact: Paper-based sensor for virus detection. The device is being commercialized by Access Sensor Technologies (AST) currently.

Investigator: Brad Borlee  
Institution: Colorado State University  
Title: Pathogen activated antimicrobial devices  
Impact: A project to evolve surfaces to sense biofilm formations and actively prevent their formation via natural dispersants. The surface treatments are based on nitric oxide therapies.

Investigator: Justin Mathis  
Institution: Colorado State University  
Title: VetMeasure Electronic Canine Collar  
Impact: VetMeasure's project utilizes a Collar-Cloud-App technology platform allowing for real-time monitoring of health and physiological conditions of dogs. Our unique vet-centric approach exploits current veterinary-client-patient relationships to add value to all parties involved.

Investigator: Jessica Prenni  
Institution: Colorado State University  
Title: Novel Device for Human Milk Concentration for Improvement of Neonatal Nutrition and Outcomes  
Impact: MMIB has developed Human Milk Concentration (HMC)-advanced filtration technology to safely and efficiently remove water from human milk without the use of external pressure or heat. HMC uses a mother's own milk to produce pure, concentrated milk containing the native essential human proteins, beneficial nutrients and immune factors that promote optimal neonate growth and play a profound role in the survival & health of a newborn.

Investigator: Seth Donahue  
Institution: Colorado State University  
Title: Thiol-ene hydrogel delivery of PTH for bone regeneration  
Impact: The study will advance the technology of hydrogel-delivered parathyroid hormone (PTH) for bone defect healing. The project will determine the effects of PTH release rates and the minimum effective dose of hydrogel-delivered PTH to achieve full healing of a critical size bone defect.

Investigator: Melissa Reynolds  
Institution: Colorado State University  
Title: In vivo Assessment of Anti-clotting Catheters using Metal Organic Frameworks (MOF) Mix-ins  
Impact: This project is a new approach for preventing clotting that is also compatible with current manufacturing processes and thus not only addresses the clinical problem, but provides a transitional pathway to the market. Because the mix-in is robust, it can be heated and stored for prolonged periods.

Investigator: F. Andrew Ray  
Institution: Colorado State University  
Title: Development of a dGH Chromosome Inversion Assay to Detect Radiation-Induced Genetic Damage in Mice  
Impact: This project is developing a new inversion biodosimetry assay using directional genomic hybridization (dGH) and provides an unbiased estimate of the dose from a previous radiation exposure. Creating and applying dGH paints for new genomes, i.e. for use in research animals, especially the mouse, will provide expanded biodosimetry applications for dGH.

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Scientific Innovation**

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Investigator: Steve Dow  
Institution: Colorado State University  
Title: Mucosal Immunotherapeutic for Respiratory Tract Infections in Dogs and Cats  
Impact: The MucosImmune technology is a new immune therapeutic composition designed to adhere to mucosal surfaces and activate local innate immunity to help prevent transmission of respiratory diseases in companion animals.

Investigator: Julie Dunn  
Institution: UCHealth - Northern Colorado  
Title: Proof of Concept Grant for Lifeboard  
Impact: The Lifeboard device captures, displays and records all essential data during time-critical medical events. Pilot clinical studies during simulated and real-life trauma interventions at the Medical Center of the Rockies have yielded sufficient data to demonstrate time-savings, feasibility, and identify human use and interface requirements.

Investigator: Gary Luckasen  
Institution: UCHealth - Northern Colorado  
Title: Clinical Validation of a Novel, Non-Invasive Biosensing Platform for Real-time Triage  
Impact: Corvectra's technology is designed to target clinical and non-clinical remote sensing applications, including triage.

Investigator: Mark Rentschler  
Institution: University of Colorado Boulder  
Title: Endoscopically Deliverable Overtube  
Impact: To prevent colonoscope looping and colon distension.

Investigator: Richard Schulick  
Institution: University of Colorado Denver  
Title: CAR-T Infusions  
Impact: This is an open label, fixed dose, phase Ib trial of anti-CEA CAR-T cell infusions delivered via the hepatic artery using the Surefire Infusion System (SIS) for patients with CEA-expressing liver metastases.

Investigator: Kelly Bookman  
Institution: University of Colorado Denver  
Title: Smart Pathways System  
Impact: Smart pathways system implementation and optimization.

Investigator: Jennifer Wiler  
Institution: University of Colorado Denver  
Title: ED Module  
Impact: RxRevu ED module product development pilot.

Investigator: Won Park  
Institution: University of Colorado- Denver  
Title: Multifunctional nanoparticle clusters  
Impact: Multifunctional nanoparticle clusters for simultaneous detection and optoporation of superficial bladder cancer.

Investigator: Ding Xue  
Institution: University of Colorado Denver  
Title: Hepatitis B virus (HBV)  
Impact: Novel compounds to eradicate hepatitis B virus (HBV) and halt disease progression.

Investigator: Shelley Miyamoto  
Institution: University of Colorado- Denver  
Title: Cardiac Allograft Vasculopathy  
Impact: Biomarker test for pediatric cardiac allograft vasculopathy.

Investigator: James Costello  
Institution: University of Colorado Denver  
Title: PrecisionProfileDx  
Impact: A genomics workbench solution to accelerate insights for cancer treatment.

Investigator: Chris Bowman  
Institution: University of Colorado Denver  
Title: Huntington's Disease Treatment  
Impact: Click nucleic acids for Huntington's disease treatment.

Investigator: Robin Deterding  
Institution: University of Colorado Denver  
Title: The Pediatric Zebra Project  
Impact: Wearable personalized pediatric devices to optimize health and lung disease management.

Investigator: Michael Holers  
Institution: University of Colorado Denver  
Title: Autoimmune and inflammatory diseases  
Impact: Novel tissue-targeted complement therapeutic agents for treatment of autoimmune and inflammatory diseases.

Investigator: Kenneth Malcolm, Ph.D.  
Institution: National Jewish Health TTO  
Title: Interferon-stimulated gene panel  
Impact: Validation of an interferon-stimulated gene panel for prediction of acute respiratory distress syndrome outcomes.

Investigator: Richard Meehan, Ph.D.  
Institution: National Jewish Health TTO  
Title: Synovial fluid analysis  
Impact: Development of a center for synovial fluid analysis.

Investigator: Michael Strong, Ph.D.  
Institution: National Jewish Health TTO  
Title: Healthy Home Indoor Environment Test Kit  
Impact: Development of a healthy home indoor environment test kit.

Investigator: Melissa Krebs  
Institution: Colorado School of Mines  
Title: Fluorapatite-containing Hydrogels as Novel Dental Filling Matrices to Repair Cavities  
Impact: Synthetic graft materials will act as biological placeholders that facilitate guided tissue regeneration processes, ultimately resulting in resorption and replacement with healthy tissue.

Investigator: David Marr  
Institution: Colorado School of Mines  
Title: Magnetic-Field Driven Colloidal Microbots Employing Wall-Based Propulsion  
Impact: A precise and controllable method suitable for exploring the body has been developed that uses rolling on surfaces for propulsion. This novel method uses oscillating magnetic fields to create and orient tire-shaped colloidal assemblies that roll along available surfaces that are plentiful within the human vascular system.

Investigator: Jeff Squier  
Institution: Colorado School of Mines  
Title: Simultaneous Spatial and Temporal Focusing Micromachining  
Impact: This innovation shows for the first time that energetic femtosecond pulses, with SSTF, can be used in conjunction with tunable acoustic gradient (TAG) lenses. The net result is an optical delivery system compatible with important industrial and ophthalmic applications.

## Early-Stage Capital and Retention Grants

### TopoGen

A research diagnostics company that provides innovative products and services for researchers working with topoisomerases and engaged in mechanism based drug discovery and development. Drug Screening Kits are available to identify topoisomerase active drugs for use in cancer chemotherapy and antibacterial applications. The company also provides assay kits for assaying both prokaryotic and eukaryotic topoisomerases (type I, II, IV, gyrase), both in vitro and in vivo.

### CereScan Corporation

CereMetrix, CereScan's unique brain diagnostic system, will increase productivity and accuracy with the most precise image processing software in the industry; reach the most likely diagnosis and treatments regimens more quickly; and discover correlations with the lick of a button using CereMetrix's cohort data analysis tool.

### Infinity

Infinity is developing a catheter-based device to treat mitral valve regurgitation - the most common disease in the US. The Infinity device is modular, allowing five components to be delivered sequentially to the mitral valve via catheters that occupy 1/5 the space of current technologies.

### IM Therapeutics

IM Therapeutics' mission is to treat and prevent Type 1 Diabetes with a once-a-day pill that interrupts the T1D patient's autoimmune processes that induces the disease.

### ProTechSure Scientific, Inc

600+ people start radiation therapy for cancer each day, 80 percent of whom will have reddening, burning itchy rash or worse from treatment. DIFINSA53 is a new, OTC skin protectant lotion that will help patients to better tolerate their treatments and lower the likelihood of severe skin damage.

### Sudhin Biopharma Company

Developing continuous manufacturing strategies for biologics. Our patent-pending novel cell settlers enable high cell densities and productivities in continuous perfusion cultures of microbial yeast cells for the first time. Through their more efficient scale up, they also reduce the size and footprint of cell retention devices for achieving high cell density perfusion cultures of mammalian cell cultures.

### RxREVU, Inc

RxREVU's Prescription Decision Support platform, RxCHECK, is a payer and EHR agnostic platform providing clinical users cost and quality insight personalized to the patient in zero to one click, to ensure the right decision is made the first time and to prevent downstream waste. RxCHECK allows clinical leaders a hard-wired line of communication to keep providers and care teams up to date on best practices and standards of care, to lower cost and improve patient outcomes.

### HepQuant Loc

HepQuant has developed a new platform of tests to measure the functional health of a patient's liver using a minimally-invasive, accurate and more convenient alternative to traditional methods.

### MenoGeniX, Inc

Building on broad patent protection and positive, placebo-controlled clinical trial data, MenoGeniX is a clinical-stage biotechnology company developing a naturally-occurring protein as a new and potentially safer alternative to hormone therapy, anti-depressants and pain medications for the 70 million women that seek therapy for hot flashes and related vasomotor symptoms associated with natural, surgical and chemically-induced menopause.

### ClearSight LLC

Developing a novel intraocular lens as a solution to posterior capsule opacification (PCO), the primary complication of cataract surgery that affects 25 percent of cataract patients. These patients must return to the ophthalmologist for an additional procedure, a YAG laser capsulotomy, costing Medicare \$350 million each year. Our device is designed to prevent this complication, thus improving healthcare quality and reducing costs.

### EnlightenVue

Single-use, low-cost disposable micro-endoscopes to mitigate the risk of contaminated medical scopes and allow for outpatient procedures. The initial focus is Arthroscopy, ENT and Urology.

### 3DBiopsy, LLC

System for the diagnosis and treatment of prostate cancer— the most commonly diagnosed significant male cancer. The 3DB System will (1) achieve improvements in biopsy accuracy; (2) reduce the need for radical surgery or full radiation; and (3) lower costs for the healthcare industry.

### Nanoly Bioscience

Evaluation of photodegradable polymer networks for encapsulation and thermal stabilization of temperature-sensitive biological molecules.

## Commercialization Infrastructure Grants

### Colorado Bioscience Institute (CBSI)

cobioinstitute.org

The Colorado Bioscience Institute is a non-profit entity providing education, workforce and career development for life science professionals, companies, students and educators related to the bioscience industry in Colorado. The Institute has grown exponentially since its formation and has created a very successful slate of pipeline programs, including the Research Experience for Teachers (RET) and Executive Leadership Programs (ELP).

### Colorado Bioscience Association

cobioscience.com

Colorado BioScience Association champions life science. The not-for-profit organization represents more than 350 member organizations and serves as the hub of Colorado's thriving bioscience sector by connecting innovators to funding, infrastructure, research and talent. CBSA grows the bioscience workforce and leads business expansion policies to advance the industry in our state.

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

cid4.com

CID4 is a 501(c)(3) nonprofit organization whose purpose is to leverage the \$500 million in annual federal research funding to Colorado's universities to generate new products to improve healthcare outcomes, reduce costs and promote the growth of bioscience industry in Colorado. CID4's primary focus is on accelerating the commercialization of promising drug, device, diagnostic, and mHealth technologies based on research and development activities at the National Cancer Institute-funded University of Colorado Cancer Center (UCCC). UCCC member institutions include the University of Colorado Anschutz Medical Campus, Colorado State University, University of Colorado Boulder, and National Jewish Health. CID4 staff help UCCC researchers and entrepreneurs connect with funding and expertise to see projects through to clinical development.

### University of Colorado Denver-Anschutz Medical Campus- Gates Biomufacturing Facility

gatescenter.org

As an academic contract manufacturing organization, the Gates Biomufacturing facility at the University of Colorado Anschutz Medical Campus provides process development, scale-up and cGMP manufacturing services to academic researchers, clinicians and biotech companies. This facility was recently established to support the development and manufacture of cell- and protein-based therapeutics with state-of-the-art clean rooms, scale-up laboratories, an analytical testing laboratory and electronic quality management systems.

### CSU- BioMARC

biomarc.colostate.edu

BioMARC of CSU is a service unit specializing in high-containment production facilities for BSL-3 organisms, CDC "Tier 1" select agents, and spore-forming bacteria. CSU-BioMARC's BSL-3 good manufacturing practice (GMP) facilities produce biologics for human clinical trials and commercialization that has included a successful FDA Pre-Approval Inspection.

### The BioFrontiers Institute

biofrontiers.colorado.edu

The culture of the BioFrontiers Institute, its interdisciplinary spirit and entrepreneurial reputation are fully embodied within its core facilities: the Advanced Light Microscopy Core, the Next-Generation Sequencing Core and the Scientific Computing Core. Together, they aim to support the local bioscience industry through a series of targeted multi-day workshops along with providing ongoing practical and personal support. This coordinated resource will aid in the recruitment, retention and advancement of skilled labor.

### StartUp Health – University of Colorado Denver

startuphealth.com

In 2011, StartUp Health introduced a new model for transforming health by organizing and supporting a global army of entrepreneurs called Health Transformers. StartUp Health is investing in 10 Health Moonshots with the long-term goal of improving the health and wellbeing of everyone in the world. With the world's largest digital health portfolio, StartUp Health announced the launch of its Colorado hub in 2016.

### University of Colorado Cancer Center

ucdenver.edu/academics/colleges/medschool/centers/cancercenter/Pages/CancerCenter.aspx

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 Anschutz Medical Campus and Colorado State University, and three 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 and Denver VA Medical Center. The Center's efforts form the basis of a comprehensive spectrum of translational prevention, diagnosis, treatment, survivorship and outreach programs and provide a framework for training the next generation of cancer researchers and physicians.

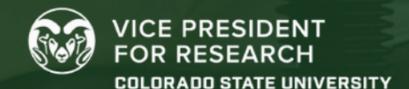
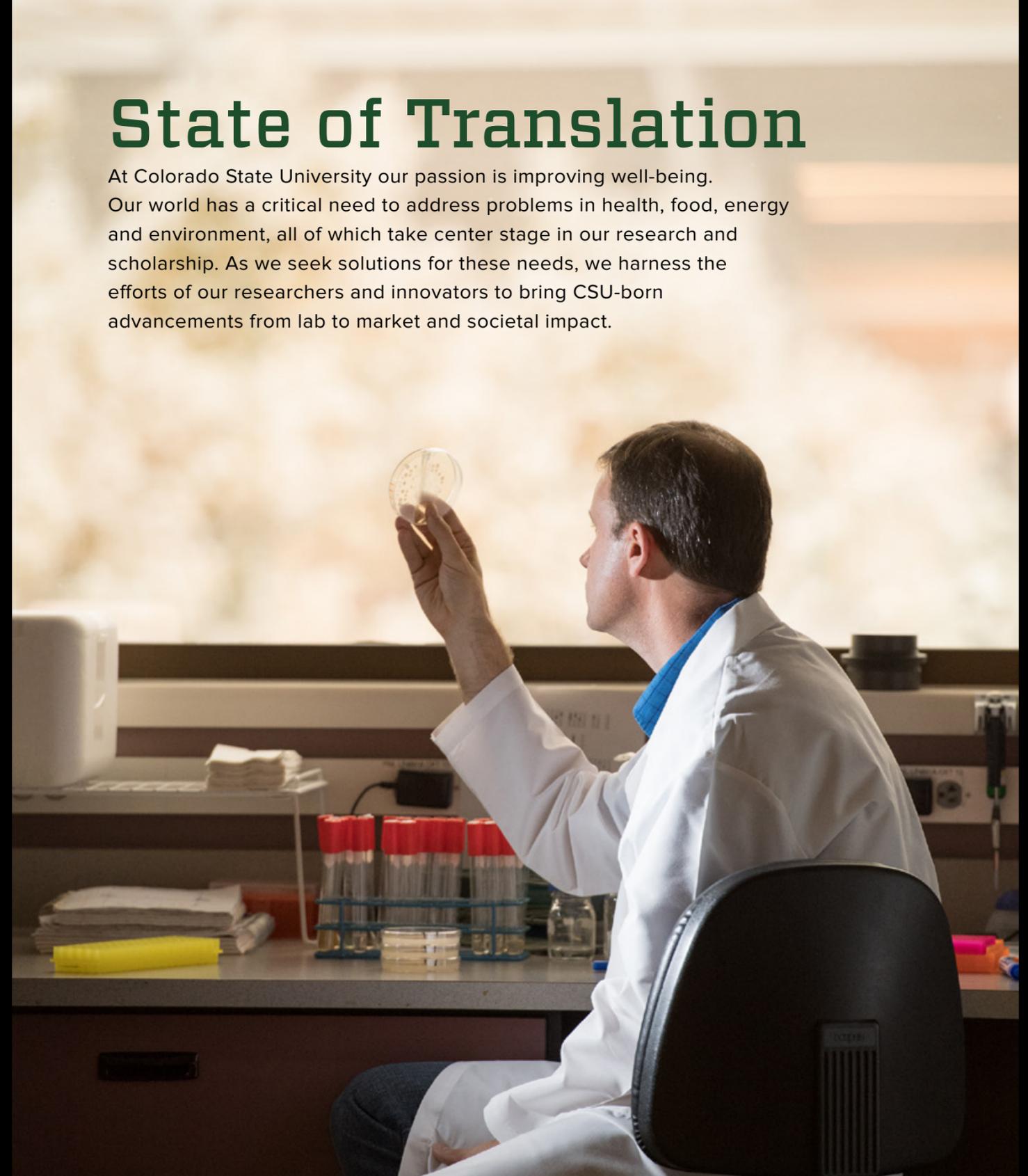
### University of Colorado – mHealth Impact

mhealthimpact.ucdenver.edu

Efficient realization and pilot testing of prototypes for technology-based programs for health promotion and disease prevention that can be tested in larger trials and primed for scalability and dissemination. The mHealth Impact Laboratory is an incubator for innovative eHealth promotion and disease management initiatives.

# State of Translation

At Colorado State University our passion is improving well-being. Our world has a critical need to address problems in health, food, energy and environment, all of which take center stage in our research and scholarship. As we seek solutions for these needs, we harness the efforts of our researchers and innovators to bring CSU-born advancements from lab to market and societal impact.



vpr.colostate.edu