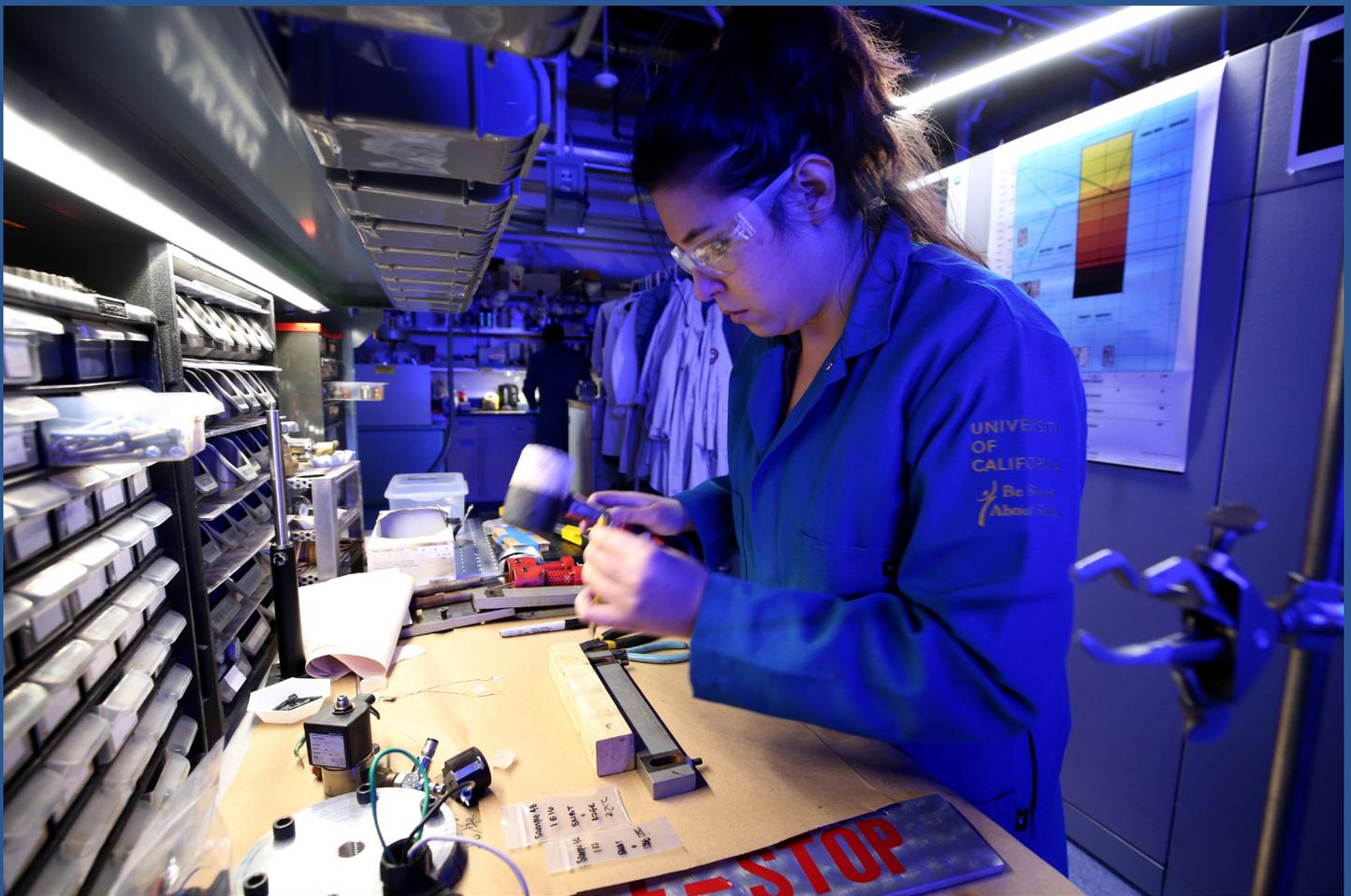


# The State of Innovation in the Inland Empire

APRIL 2021



PART SEVEN IN A SERIES



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## EXECUTIVE SUMMARY

The innovation economy in the Inland Empire—whether measured by startup formation, acquisitions, investments, jobs, research and development activities—have grown significantly in the last decade, and offer great promise for the thousands of bachelor’s and master’s degree graduates who graduate each year from the region.

This report provides an overview of the innovation ecosystem in the Inland Empire, offering an opportunity for investors and stakeholders alike to better understand the landscape of assets, relationships, and activities that are diversifying the region’s economy and enabling it to grow more high-skilled jobs.

The report touches on relevant research in the field and offers several models for understanding the concept of an innovation ecosystem and how it functions. Additionally, we catalogue the most significant innovation sectors in the region, including those with long histories and those of more recent vintage.

Importantly, the Inland Empire is home to a rapidly growing skilled workforce. According to job posting data, jobs in the innovation sector have grown by 88% since 2016, a rate comparable to the rest of Southern California. The IE’s skilled workforce is also racially diverse, with Latinx students accounting for 33 percent of STEM graduates with bachelor’s or master’s degrees in 2019, and Asian American and Black students accounting for 29 percent and 3 percent, respectively. Still, more progress needs to be made, particularly with respect to the racial diversity of students with master’s degrees in STEM fields, and for Black STEM graduates at both undergraduate and graduate levels..

Our industry and sector analysis shows that there are several active and thriving innovation clusters in the Inland Empire, including in consulting, health care, and e-commerce, with emerging strengths in biotech, clean energy, and clean transportation. Our survey and interview data also indicate a strong willingness to collaborate among various innovation-sector leaders in the region. Importantly, firms, investors, and policy leaders are also growing their connections to related hubs in Los Angeles, Orange County, and San Diego.

Given the emergent strengths of these Inland Empire clusters, it will important for economic and policy decision-makers to seize the moment and 1) invest in ecosystem builders who can bolster the region’s ability to drive deeper collaborations, 2) shape a stronger narrative for internal and external audiences, and 3) strengthen emergent relationships and partnerships that connect the Inland Empire with the rest of Southern California, particularly in areas such as biotech, information technology, clean energy, and clean transportation.

## WHAT IS AN INNOVATION ECOSYSTEM?

There are many different ways to define an innovation ecosystem and identify its characteristics and components. While the conversation around particulars is still ongoing in the literature, this report leans on a standard definition found in numerous studies. According to Moore 1993, an innovation ecosystem refers to a “loosely interconnected network of companies and other entities that co-evolve capabilities around a shared set of technologies, knowledge, or skills, and work cooperatively and competitively to develop new products and services.”

It is important to note that an innovation ecosystem is not static and is constantly evolving. Due to the fundamental connectedness between sector components and relationships, and the notion that innovation is new and can be “disruptive” to systems, healthy innovation ecosystems are often characterized as both fluid and dynamic.

Akin to an ecosystem found in nature, an innovation ecosystem is cyclical and is often the foundation for new innovations. In terms of economic development, innovation ecosystems are important because they not only facilitate and support new development, but they can ultimately benefit the local community living in the region as well through opportunities, increasing revenues and resources, and contributing to a region’s sense of place.

## KEY INGREDIENTS & CONCEPTS

Much like the definition of an innovation ecosystem, there are many different models and diagrams that help to visually capture the ecosystem components and their relationships. It is important to note that each innovation ecosystem can vary regionally. This report uses a simplified conceptual map of innovation ecosystems based on current literature and feedback from local ecosystem stakeholders (see Figure 1, page 4). While there are many subcategories—for example, with industry actors representing small and large businesses, startups and well-established firms—we use a simpler framework that has broad application across industries.

## COLLEGES AND UNIVERSITIES

The role of higher education in the innovation ecosystem is well documented in the literature. Most commonly, higher education has been considered as both an “engine” for innovation and a “catalyst” for development. More recently, research has shown that the role of colleges and universities has been evolving beyond standard ecosystem services like improving the quality of local labor, aiding in technology transfer and research commercialization, and enhancing the attractiveness of the local environment for entrepreneurs (Cai & Lui, 2020).

## QUICK FACTS

### DOLLARS RAISED BY INLAND EMPIRE INNOVATORS IN RECENT YEARS

**\$580 MILLION**

*Source: Crunchbase Database, Analysis by Blended Impact*

### SINCE 2016, INNOVATION SECTOR JOB POSTINGS IN THE I.E. HAVE RISEN BY

**88%**

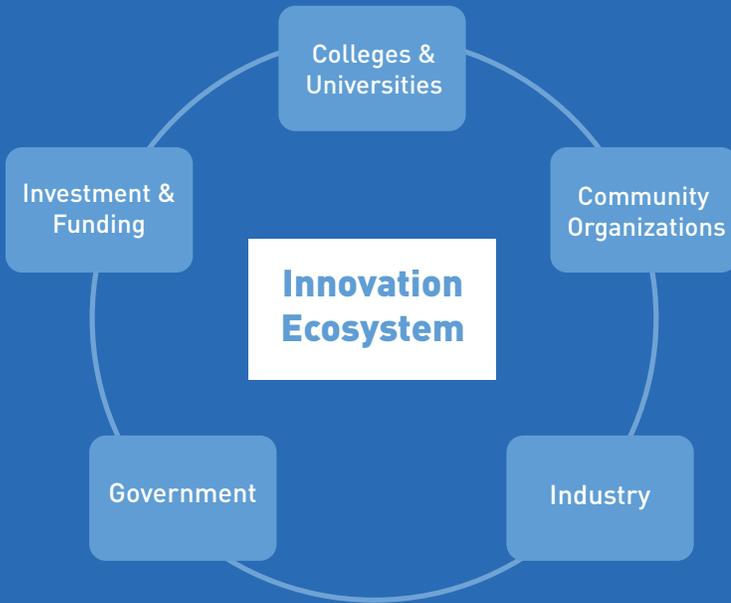
*Source: Crunchbase Database, Analysis by Blended Impact*

### KEY SKILLS MENTIONED IN INNOVATION SECTOR JOB POSTINGS IN THE I.E.

Skills	# of Mentions
Business Process and Analysis	24,892
Software Development Principles	17,275
Enterprise Resource Planning (ERP)	14,639
Business Strategy	14,576
System Design and Implementation	14,367
SQL Databases & Programming	13,543
Business Development	10,968
Graphic & Visual Design Software	9,959
Product Development	9,656
Data Analysis	9,581

*Source: Burning Glass Data, March 2020 to Feb. 2021*

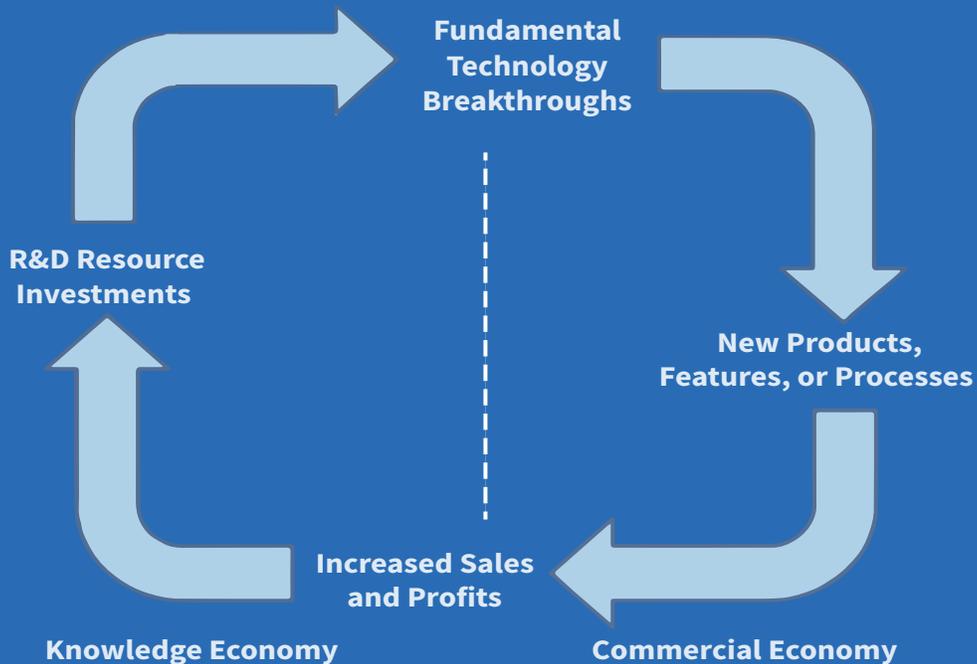
**FIGURE 1  
KEY COMPONENTS OF AN  
INNOVATION ECOSYSTEM**



**FIGURE 2  
FUNCTIONAL ASPECTS OF AN  
INNOVATION ECOSYSTEM**



**FIGURE 3  
RELATIONSHIP BETWEEN KNOWLEDGE ECONOMY & COMMERCIAL ECONOMY**



Source: Figure 3 is based on research by Jackson (2011)

*Examples of local colleges and universities that form the Inland Empire innovation ecosystem include UCR's Center for Environmental Research and Technology, The Cybersecurity Center at CSUSB, and the Center for Spatial Studies at the University of Redlands.*

## INDUSTRY SECTORS AND FIRMS

Industry and business are absolutely fundamental in the innovation ecosystem. Like higher education, this group can serve as an innovation engine, but unlike higher education, industry sectors already have well-established supply-chain distribution networks, customer markets, and other essential mechanisms that help the ecosystem actually produce innovative products and services.

Large and well-established corporations often do not directly compete with smaller startups, although their interaction can range from accommodation, to mentoring, integration into supply chains, and outright acquisition. Mentoring and support from larger corporations to startups and entrepreneurs often involve co-creation of new solutions, supplying technology, building distribution channels, as well as potentially involving startups in the development of new business directions and products.

For example, companies like Apple, Google, YouTube, and Toyota nurture their innovation ecosystems as a business strategy—by investing in innovation partnerships that help make their suppliers, customers, and other members of their ecosystem smarter, faster, richer, more innovative, and more creative (Gobble 2014).

*Examples of local firms that are significant innovation ecosystem players include: ESRI HQ in Redlands, CA that supports the growth of startups that enhance the firm's offerings, and also gets involved in local infrastructure projects such as Redlands Rail.*

## COMMUNITY ORGANIZATIONS

Community organizations and nonprofits can also be an essential component of the innovation ecosystem. These organizations help to bridge the gap between local communities and other components of the ecosystem. Depending on their mission and goals, community organizations can interface with the ecosystem in two general ways:

1. The organization has local impact, focusing on solving local issues. This means the organization puts an emphasis on applying entrepreneurial focus on local challenges and opportunities, in addition to identifying opportunities for application in similar challenges in other regions.
2. The organization interfaces with the ecosystem by bringing together communities of practice around entrepreneurial, industry, and technical groups.

Community organizations help to connect innovation ecosystems with the uniqueness of a particular place. The importance of this type of “place-making” is often undervalued and overlooked in popular understandings of innovation ecosystems. A sense of place and culture can have a serious impact on the success and growth of innovation clusters. Additionally, community organizations often have their pulse on the local community and can serve as a mediator pulling the entire system together.

One particular type of community organization that merits particular recognition are Chambers of Commerce. Formed as a vehicle for local businesses to network and promote the community's business interests, such organizations are particularly representative of their locality and provide a unique opportunity for peer support, mentoring, and networking. In addition, nonprofits and nonprofit coalitions engaged in areas such as education equity, environmental justice, health, and workforce development can play an important role in inspiring youth, establishing core values, and cross-sector relationships that foster entrepreneurship and innovation.

*Examples of local community organizations that are significant innovation ecosystem players include Growing Inland Achievement, which supports economic and workforce development; Youth Mentoring Action Network and Youth Action Project that connect and inspire youth to new workforce opportunities; and Alianza Coachella Valley, which builds cross-sector coalitions for inclusive, sustainable, and equitable economic and workforce development in the Salton Sea region.*

## GOVERNMENTS

In the United States, governments generally utilize a bottom-up approach while building and interacting with an innovation ecosystem. At each level (federal, state, and local), governments tend to set up competition-based rules that facilitate linkages and networks among universities, entrepreneurs, accelerators, venture capital, large firms, and consultants. In a bottom-up approach, the government regards its role as a facilitator and promotes innovation through market mechanisms, such as indirect incentives. This includes the type of regulations that help give shape to an innovation ecosystem.

In interviews for this report, the local government entities we interviewed noted they prefer to play the role of facilitator rather than investor or intervenor. Our interviews suggest that government agencies in the region and in other levels of government (regional, state, and federal) should consider taking on the role of “enricher” of innovation ecosystems. This is a fairly new concept, pioneered by Sun et. al 2020. An enricher

## PROFILE

### ALLIANCE SOCIAL

**Representative:** Eric Eide

**Position:** Director of Ecosystem Development

The Alliance for Southern California Innovation (the “Alliance”) brings together Southern California’s top research institutions, local business leaders, and world-class advisors to focus on bridging critical gaps in the SoCal innovation ecosystem. The goal of the Alliance is to engage and unify So Cal’s compelling diversity of talent, ideas, and perspectives in order to optimize the conditions for the region’s innovators to bring breakthroughs to the world.

Key components of an innovative ecosystem include mobilizing a broad group of stakeholders that can support entrepreneurship and innovation. Eric describes an ideal coalition of universities, city governments, advocacy groups, business leaders and corporations. “Those are the core groups that we think are foundational to having a vibrant ecosystem,” explains Eric, “We also need to collaborate and be connected. We need to have the pieces, they need to talk to each other, they need to be aligned, and work together on activities that deliver impact.”

Eric describes the confluence of capital, ideas, and infrastructure that are needed in order for true innovation to take place. These include human capital, risk capital, IP generation, corporate partners, and, often ignored in the discussion, the culture element that includes a risk-taking mentality and people willing to pursue new ideas. “All of these integrated elements are what create an ignition for an innovation ecosystem,” explains Eric. As he explains, “Capital follows opportunity; it looks where innovation is happening”.

As a historically marginalized region, a continuing challenge includes a lack of awareness about the capabilities and opportunities that exist in the region. Eric notes that it is important to highlight those capabilities and to hold up examples to inspire people locally, to provide a road map and the tools to help local leaders support and develop their community’s innovation potential. “Having resources, infrastructure, and being authentic about the region’s core competencies all important for raising the region’s stature.” As for opportunities for strengthening the innovation sector in the Inland Empire, Eric notes the importance of partnerships and collaboration, as well as defining the center of gravity in the region.

is defined as, “an entity that fertilizes the interactions and linkages of multiple stakeholders in innovation ecosystems in a non-hierarchical and non-linear way.”

Enriching the ecosystem can be done in a variety of ways including investments in infrastructure. In Riverside, one example is the proposed zero emission, self-powered, electric Riverside Streetcar,<sup>2</sup> which would provide a circular route through downtown Riverside’s economic core, and connect this commercial center with the University of California Riverside. Beyond physical infrastructure, like roads and bridges, this could also mean expanding broadband access and other digital infrastructure. Finally, the Center for Social Innovation, through its national work on Census Legacies, is pioneering a concept of civic infrastructure that includes regional media coalitions and public financing of community media, to better inform regional players about important policy and economic developments that strengthen inclusion and equity.

Examples of local governments that play a significant role in strengthening innovation ecosystems include the Coachella Valley Association of Governments (CVAG), and cities such as Riverside, Redlands, and Murrieta through activities ranging from land use and planning, to corporate relationships and programmatic support for entrepreneurial activity.

## INVESTMENT & FUNDING

Investment and funding is the only part of the innovation ecosystem that is not a specific group of entities. This capital and monetary support allows the innovation ecosystem to function and helps new and innovative products/services enter existing markets. It is important to note that without adequate investment and funding the innovation ecosystem would not function.

*Examples of local funding vehicles include the Highlander Venture Fund, which is anchored to UC Riverside and managed by Palo Alto based Vertical Venture Partners. It is the Inland Empire’s first venture capital fund, with a \$1.5 million investment in Sensorygen in April 2021 as their most recent activity. The region also has a Tech Coast Angels IE Chapter, Riverside Angels Group, and has received investments in companies from notable investors such as Techstars, 500 Startups, and Mark Cuban.*

## HOW THE ECOSYSTEM WORKS

There are many ways to visualize how an innovation ecosystem works. In addition, scholars and researchers still debate over which components and functions should be included and excluded. Furthermore, research suggests that each innovation ecosystem functions differently and is highly dependent upon the specific stakeholders in the system (Sant et al. 2020).

Figure 2 shows the 4 primary elements of the innovation ecosystem from a policy perspective in a circular diagram. Very simply, each of these pieces are needed for the ecosystem to function. Policies that facilitate and promote the relationship and movement between each of these components, benefit the entire ecosystem. It is important to note that within each of these elements are additional components, not listed.

**Workforce Development** - The policy ecosystem is heavily reliant on strong workforce development. As a main driver, workforce development needs to be robust and intentional.

**Research Commercialization** - At the intersection of technology and knowledge communication is research commercialization. What was once a vague term to capture soft technological and science skills, is now a power industry leading the “knowledge economy”. Those who are active participants in research commercialization are uniquely positioned to navigate both innovation and industry.

**Risk Capital** - Policy innovation requires risk capital; high-risk and high-reward investments. At its core, risk capital requires trust and diversification in investments. Those who are successful at gaining risk capital are those who can confidently navigate the knowledge economy and innovation industry.

**Sector Planning & Support** - Local governments can make specific investment in the innovation sector through a variety of planning and support. This can include infrastructure, like broadband access, but can also include marketing and narrative campaigns about the innovation ecosystem.

The relationship between the research (knowledge economy) and the commercial/industry economy is displayed in Figure 3. Innovation often starts within the “knowledge economy” funded by research and development investments. During the technological breakthrough phase, the innovation crosses over from the knowledge economy into the commercial economy. If the new products, features or processes are commercially viable, then it will likely lead to increased sales and profit, which can then be fed back into more R&D investment completing the cycle.

At a deeper level both Figures 2 and 3 (page 4) model the relationship between actors or entities whose functional goals enable technology development and innovation. Actors include the material resources (such as funds and equipment) and the human capital (industry researchers, and staff) that support the participation of institutional entities in the ecosystem (Jackson 2011). The following sections detail additional actors and entities that are necessary for the ecosystem to function.

## INCUBATION & ACCELERATION

Incubators and accelerators play a significant role in the innovation ecosystem, and it is important to note their distinct

## PROFILE

### CITY OF MURRIETA

**Representative:** Scott Agajanian

**Position:** Deputy Director of Economic Development

Murrieta, located in South Riverside County, is one of the newest and most innovative communities in the region. With a populace that has a higher than average number of residents with bachelor’s degrees, the city chose healthcare as a field that they wanted to focus on. “Economic development started getting more innovative, including more emphasis on workforce development, innovation, and entrepreneurship. This is how we are taking healthcare and moving beyond being a healthcare service provider. We are now getting into biotech,” explains Scott. The city’s biotech incubator, the Murrieta Innovation Center, is now a biotech hub, bringing in patents, investment, and new industry. He views his role as Deputy Director of Economic Development as a facilitator between business, real estate, and city government.

A challenge includes a dearth of funding sources, particularly in terms of recognizing the intellectual property value in the region, “There is a severe lack of investment in ideas,” says Scott. The region is starting to change, with startups getting priced out of the Los Angeles and San Francisco markets and moving to the area because of the opportunities that are blossoming for innovation. Still, he believes, political will and a commitment to economic growth plays a crucial role in the quality of investments and startups.

A challenge that exists with building out the innovation ecosystem in the Inland Empire includes getting more cities across the region on board. As he says, “It takes more than just a few cities steering it. All cities want to have an innovation footprint, but it takes an investment from all of the cities in the region, in both counties.” He believes a stronger coalition will allow for more opportunities to showcase the innovation that is happening in the region. Scott also believes that the moment is ripe for even more growth over the next ten years, particularly as Riverside County becomes more separated from the coastal region because of population growth and commuting patterns, “This will cause the necessity of innovation and will speed up the business development process,” he describes. All cities have opportunities for support and the talent needed for more growth, but intentional cultivation is key to ensuring sustained growth in the IE.

roles. Accelerators work to “accelerate” the growth of an existing company, while incubators “incubate” ideas and innovations with the hope of building out a business model and company. Essentially, accelerators focus on scaling up a business while incubators are often more focused on innovation. This report includes a detailed directory of local incubators and accelerators (see pages 36–39).

## TALENT

Another essential component of the innovation ecosystem is the talent pool. Without local talent trained in these innovation sectors, innovators must look outside the region to meet their employment needs. In this report, we make the case that there is a strong and diverse talent pool in the Inland Empire. For example, recent research from Boston Consulting Group (BCG) and Alliance for SoCal Innovation, found that the City of Riverside is a talent anchor in the region, among other innovation nodes and hubs in Southern California.<sup>4</sup>

While this talent pool is strong, it does need investment and further cultivation. The region’s residents have played a vital and longstanding role in contributing to building the current ecosystem, though many residents still look to coastal counties for higher-paying jobs and business growth opportunities. This, however, does not need to continue to be the case, and there are several investments, policies, and activities that can cultivate and retain talent. For instance, one way to accelerate the organic growth of any region’s given talent base is to strengthen collaborations between the tech ecosystem and local universities by subsidizing internships and new graduate hiring by startups. Scholarship and loan programs with incentives for local placement can also help regions retain their talent.

## MENTORING

Mentoring is key for the success of entrepreneurs and innovators. Mentors provide valuable feedback to build ideas, connect those ideas and ideators with similar or linked concepts and people. A strong and diverse network—of other entrepreneurs, mentors, service providers, and investors—helps entrepreneurs share ideas, access resources, receive encouragement and advice, overcome barriers, and learn about new opportunities (Isabelle, 2013; Stam, 2015). Although individuals have their own set of relationships, an innovation ecosystem can help formalize, expand, and activate an entrepreneur’s network, and act as a support system of mentors, peers, service providers, etc. (Mason & Brown, 2014).

## ENTREPRENEURS

Entrepreneurs are the driving force behind the innovation that is created in the ecosystem. Additionally,

entrepreneurship is a key contributor to sustainable economic growth and development. It not only creates employment, but increased spending in markets, knowledge transfers, employment and innovation (Meyer & Jongh, 2018). As pointed out by Nambisan, Satish, and Baron (2013), entrepreneurs often face a conflict between working within the vision, goals, and structures already in place in the ecosystem, but they must also ensure sufficient differentiation, independence, and disruption for their companies and pursue a unique value proposition, distinction, and independence.

Overall, there is no one entity that owns or represents the innovation ecosystem. Because of this, there is no single objective that motivates all of the actors within the system. The motivation for fostering entrepreneurship depends on the stakeholder. For public officials, job creation and tax revenues may be the primary objectives. For universities, the primary motivators can include increasing knowledge generation, reputation, donations and corporate partnerships. Wealth creation may be the primary benefits for investors and entrepreneurs, although the latter also tend to value innovation and creative disruption as inherent motivators. For larger corporations, the primary benefits can include fostering innovation, product acquisition, talent retention, and supply chain development. Many stakeholders must benefit in order for an innovation ecosystem to be self-sustaining.

## INNOVATION SECTORS IN THE INLAND EMPIRE

The Inland Empire has long been a place for innovation. The resilience of its people in the face of various challenges makes it a region of grit and determination that often spurs innovative solutions. In the following section we outline some historical examples of innovation in several industry sectors.

The economy of the Inland Empire has changed over time from the citrus boom in the late 1880s to the more recent logistics (e.g., transportation, third-party logistics, e-commerce) healthcare, manufacturing, and renewable energy sectors. While each industry has experienced some form of innovation in the past, recent advances in technology and science have highlighted clear innovative possibilities in certain sectors. This report defines innovation generally as the implementation of a new or significantly improved good or service, or process (Gault 2018).

Not only do these innovations advance the industry as a whole, but they also influence the abundance of middle and high-skill jobs and capital investments in the region. Additionally, certain innovations may contribute to the Inland Empire’s overall narrative as a region.

Innovation sectors help to shape how the Inland Empire is perceived by those living outside and within the two counties.

## AGRICULTURAL TECHNOLOGY

The Inland Empire's history with agriculture dates back to the tribes and first people who called the region home. Native people and later Spanish settlers in the region mainly had small scale farms to help provide for local communities (Patterson 2016). This dynamic changed in the late 1800s, when the development of the Santa Fe railroad enabled the development of large-scale citrus farming. The number of citrus groves grew rapidly from the late 1870s onward, and by 1882 there were half a million citrus trees in Southern California, half of which were in Riverside County (Patterson 2016).

In addition, the innovation of refrigerated box cars in the early 1890s opened up markets all across the country to local growers (Patterson 2016). Around this time, citrus growers in the region lobbied successfully for the creation of a state-funded research center. Ultimately, in 1907 the University of California established a citrus experiment station in the City of Riverside, which formed the basis of a fully established college campus in 1954 following the growth of college enrollment in California under the GI Bill. Currently, UC Riverside still conducts citrus and agricultural research through the College of Natural and Agricultural Sciences (CNAS) and the Bourns College of Engineering, and the UCR's plant biology program remains one of the highest ranked in the country.

Recent developments in artificial intelligence (AI) and machine learning (ML) software are changing the landscape in agriculture. This advanced software is already powering a new generation of machines capable of distinguishing between healthy and sick plants, ultimately increasing yields and reducing labor requirements. Other developments on the horizon are improvements in farming material conservation and autonomous self-driving tractor capabilities.

For example, in 2020 the USDA awarded UCR a \$10 million grant led by professor Elia Scudiero, an expert in soil, plant and water relationships. He and a team of UC Riverside scientists will work to develop artificial intelligence data needed for smart farming systems with new statistical and algebraic models that find repeated and generalizable patterns.

## BIOTECH

Historically, biotechnology in the Inland Empire was based around agricultural technology including research into fertilization methods and pest control. In the early twentieth century, scientists gained a greater understanding of microbiology which led to new and innovative discoveries

## PROFILE

### CITY OF RIVERSIDE

**Representative:** Nathan Freeman and Jon Marks  
**Position:** Senior Development Manager;  
 Project Coordinator

The City of Riverside's Innovation District is years in the making and stems from the Mayor's vision. It focuses on building a model of "live, work, and play" with support for small entrepreneurial startups that connects the UC Riverside area, downtown, and East Side neighborhoods. Nathan and Jon describe the process of building out the vision as involving a series of community engagement events with multiple stakeholders, including representatives from public, private, and educational sectors.

The components of Riverside's innovation district are multi-pronged, including training to provide formal and informal pathways for people to be involved in the district, access to capital, mentorship, and public/private partnerships—all with the goal of creating a spectrum of investment opportunities. Nathan believes that a cohesive model that welcomes innovation will serve the entire city, and a critical piece of this work includes understanding community needs and ensuring buy-in from all stakeholders.

A challenge that can potentially impede innovation in the Inland Empire includes a lack of project funding. A more streamlined process for adopting innovative projects and clearly identifying regional leaders and champions would also be beneficial. Finally, encouraging more community participation and working through challenges will be important for the innovation district to succeed. Nathan and Jon remain optimistic about the opportunities to strengthen the innovation sector in the region, including programs that aid in building strong communities, keeping the City of Riverside as a great place to live, and removing barriers to innovation and entrepreneurial activity.

including the development of antibiotics. The field of modern biotechnology is generally thought to have begun during the 1970s with innovations in gene manipulation technology.

In the Inland Empire, institutions of higher learning including UC Riverside and Loma Linda University became the centers for biotechnology research in the region. In addition to these universities and colleges, several biotech companies currently operate in the I.E. including GeneLux in Redlands and Mammoth Technologies in Moreno Valley.

UCR's Life Sciences Incubator is the first of its kind in the region offering office and research space for biotech startups. Officially launched this year, the wet lab Incubator already has four tenants: Karamedica Inc, NeyroblastGX LLC, GattaCo Inc., and Murrieta Genomics Inc.

Karamedica is developing a chitosan-based nanoparticle drug delivery technology for transporting synthetic DNA from the nose to the brain in an effort to treat cerebral amyloid angiopathy, a condition that afflicts more than 85% of patients with Alzheimer's disease and leads to breakdown of the arteries in the brain and cognitive decline.

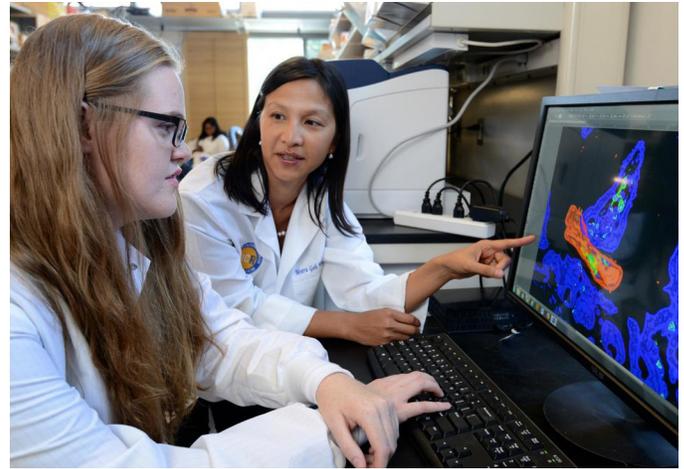
Murrieta Genomics is dedicated to advancing the use of genomic sequencing in precision medicine, agriculture, forensics, veterinary and direct-to-consumer applications.

GattaCo is developing new disposable microfluidic devices which separate plasma from blood eliminating the need to centrifuge samples and enabling diagnostic testing which can be run anywhere with just a few drops of blood.

NeyroblastGX is focused on the development of cerebral and gastrointestinal organoids to study pathogenic versus non-pathogenic bacteria using high-content microfluidics for early detection of battlefield threats.

Loma Linda University also has an incubator named "n3Eight" (pronounced "incubate"). The center will bring academic and clinical researchers together with business and corporate leaders to launch new products based on their discoveries. According to Michael Samardzija, PhD, JD, associate vice president for research, the center will benefit society by finding new cures and management strategies for a wide variety of diseases and medical disorders.

In addition to the business incubator, research coming out of Loma Linda University has led to several innovations in the medical and biotech sector. For example, LLU in partnership with MedDevCo, LLC created a new medical device company, DARRT, LLC and launched its first product, also called DARRT. The product, a laser



Source: Photo Courtesy of University of California, Riverside

guided percutaneous access needle, is designed to eliminate or minimize radiation exposure to patients, physicians and staff during Percutaneous Nephrolithotomy (PCNL) cases.<sup>5</sup>

Babcock Labs is another notable company in the region. Based in Riverside, Babcock Labs is an employee-owned commercial laboratory that specializes in environmental testing, including the analysis of drinking water, wastewater, groundwater, storm water, and hazardous materials. The company has a Women Owned Business designation, with women making up 63% of their employees. This is especially notable in the STEM field, which is often dominated by men.

## CLEAN TECHNOLOGY & NATURAL RESOURCE MANAGEMENT

Starting in the mid-1990s, the rapid growth of offshore production by transnational corporations increased the need for worldwide distribution centers (Bonacich 2005). This growing demand favored new warehouses that needed to be larger and more high-tech than warehouses along the coast in places like Long Beach. The Inland Empire saw an exponential growth in new warehouses during this time. A by-product of this increase in warehouses was the influx of transportation and other logistics activity in the region, a trend that has accelerated through the development of e-commerce, particularly after Amazon opened its first California fulfillment center in San Bernardino in 2012. As of fall 2020, Amazon owned "nine fulfillment centers, three cross-dock locations, two sorting centers and one Amazon Air facility" in the Inland Empire, making it the region's largest private employer with 20,000 workers (Smith 2020). The rise of commercial trucks and other goods movement in the Inland Empire has accelerated during the COVID-19 pandemic, and continues to worsen highway traffic and air quality in the region.

New innovations in clean logistics and electrification are poised to significantly change the landscape of goods movement, reducing pollution and routing trucks away from historically disenfranchised communities. For example, commercial trucks may utilize cleaner fuel systems or more efficient routes, further away from large residential populations. While much of this work is still underway, it is essential that community organizations and advocates be included as experts and leaders in finding viable solutions. There are significant opportunities in the Inland Empire to take a leadership role in sustainable mobility, with lessons that can be adopted elsewhere in the country.

Innovations in air quality management in the Inland Empire are notable. A combination of climate, geography, and industry puts the region at a great disadvantage in terms of air pollution. Prevailing winds typically push smog from the west towards San Bernardino and Riverside counties, where mountains keep the unhealthy air contained. Air quality has been a long-standing concern in the region. During the 1950s and 1960s, research from UC Riverside found that one of the first indications of the ill effects of smog was its damage to plants. Pressure from environmental groups, plus innovations in smog monitoring and industry regulations drastically reduced air pollution in the region, with continuing falling levels since 1974. These significant advances can be attributed to the work of the South Coast Air Quality Management District (SCAQMD) and its state and federal agency partners. Despite increases in population and the number of motor vehicles on roadways, fine particulate pollution has declined by about 50 percent during the past 15 years in the Inland Empire. Levels of ground-level ozone, also known as summertime smog, have been reduced by about 35 percent during the same time period. However, the Inland Empire still suffers from some of the highest ozone and PM2.5 levels in the nation<sup>6</sup> (see also Bluffstone and Oudenkirk 2007).

While SCAQMD continues its work to regulate and reduce stationary air pollution in the Inland Empire, the new development of the CARB (California Air Resources Board) research headquarters in Riverside will also bring new resources and opportunities to innovate in the reduction of mobile sources of air pollution and create more high-skilled jobs and related workforce development opportunities. These opportunities include both direct roles that CARB can play as an employer and community partner, but also indirectly through the growth of associated research and commercial activity involving university and industry partners. CARB works with air districts, community groups and members, environmental organizations, universities, and regulated industries to reduce exposure in communities impacted by air pollution. The construction of CARB is completed and is expected to be formally

## PROFILE

### ESRI

**Representative:** Brooks Patrick and Christine Ma  
**Position:** Business Development Manager Smart Cities at Esri and Account Executive

Esri is a technological provider of the geographic information systems software web GIS and geodatabase management applications. The company is based in Redlands and aids both cities and businesses with general plan updates and data to improve city housing, transportation, and environmental structures. Esri was founded as the Environmental Systems Research Institute in 1969. Throughout recent years, Esri has grown significantly in terms of business development and production. They have 10 regional offices throughout the nation, and 80 international distributors, and are the foundational component of a tech-centered innovation cluster in the Redlands region.

Brooks and Christine are currently managing ArcGIS Urban, which facilitates urban planning through 3D-application, scenario planning, and impact assessment. Another project is ArcGIS Hub, which is a cloud of data intended to be shared and utilized for in depth planning and community assessment. Both ArcGIS Urban and Hub are centered around the workflow process necessary for an update policy. Whether its a warehouse or multi-story building, ESRI has the software that allows government approvals and local organizations to review proposals from these infrastructure more effectively. ArcGIS Urban specifically provides a 3D map to review hidden factors that surround the building and affect the proposal.

Brooks believes that affordability is working well in the Inland Empire. Major cities are struggling with housing challenges associated with not building enough residential units to keep up with their development. The city of Boston, for example, faced an exponential growth in population recently and now have to grow by nearly 100 projects a year. To keep up with the development, they had to add new housing goals increasing the amount of housing units and also ensuring they are affordable. Additionally, construction costs have also risen by about 60% within the last 20 years. Combining these two factors where most areas will have to grow more bearing in mind that its becoming more expensive to grow, the Inland Empire is in a roughly better position. The IE for a long time has not been densifying but has now gained the opportunity to do so. A lot of Esri's interactions with cities in the IE go into the planning and policymaking for making the IE more developable and prepared for a denser population in the future. The IE is in a good spot right now in that it provides middle-class income housing opportunities that would not be available in parts of Los Angeles and also parts of Northern and Mid California. The IE also has the unique ability to promote affordability as well as a proximity with local developing areas like Orange County and LA County. A part of the reason Esri is where it is today in the IE is actually because of the specific positioning and affordability of the region.

**PROFILE****SAN BERNARDINO COUNTY  
TRANSPORTATION AUTHORITY (SBCTA)****Representative:** Carrie Schindler**Position:** Director of Transit & Rail Programs

The San Bernardino County Transportation Authority is the primary organization in charge of regional transportation planning, allocation of transportation funds, and construction of major transportation projects in San Bernardino County.

Currently, SBCTA is leading the Redlands Passenger Rail Project. This innovative project includes introducing tier 4 Diesel Multiple Units (DMUs) into the Metro-link system between Redlands and San Bernardino. These are smaller trains that can fit on the heavy tracks and run in the same areas as the heavier locomotives and even freight trains. Three of these units are expected to be operational by 2022. Further, SBCTA in partnership with CalSTA and Stadler Rail, is developing a hydrogen powered zero-emission multiple unit (ZEMU) based on the DMUs. Ultimately, the ZEMU will produce zero exhaust emissions of pollution through any methods of function. The ZEMU will be the first in the nation of its kind. The ZEMU will comply with FRA requirements to fit in heavy rail lines, making them easily transferable to existing rail systems throughout the region, and are now smaller, lighter, and more efficient than previous trains. After testing in Europe, the ZEMU will be delivered to the Inland Empire in late 2023.

Carrie mentions that there are numerous secondary benefits from the Redlands Passenger Rail Project. The rail rides along the I-10 freeway, alleviating the congestion and traffic that usually occurs there. There is also a social benefit to being on the train with other members of the community and also having access to Internet connection with a laptop or phone to work during your commute. The University of Redlands has a program for students to take part in internships focused on community service projects in Los Angeles. Many of the students don't have access to personal vehicles, so they rely on the transit system. The University also has a partnership with Esri, and the rail system facilitates transportation and communication between the two campuses.

Carrie believes that public-private partnerships like Esri, the University of Redlands, and SBCTA are vital for the community as they provide each other with innovative technology, local support, and diverse inputs in necessary conversations.

unveiled in November 2021. The University of California, Riverside is developing an industry research park that leverages research synergies with CARB called OASIS, part of a larger regional vision of research and economic activity in clean energy, clean transportation, agricultural technology, and natural resource management (see p. 18).

**UCR COLLEGE OF ENGINEERING, CENTER FOR ENVIRONMENTAL RESEARCH & TECHNOLOGY (CE-CERT)**

CE-CERT was established in 1992 at UC Riverside and is now the largest research center on campus. The center's mission is to be a recognized leader in environmental education, a collaborator with industry and government to improve the technical basis for regulations and policy, a creative source of new technology, and a contributor to a better understanding of the environment. CE-CERT brings together multiple disciplines throughout campus to address society's most pressing environmental challenges in air quality, climate change, energy, and transportation.

CE-CERT also has a longstanding relationship with CARB, having been research partners on many projects. Additionally, part of CARB's relocation partnership will be unique internship opportunities for undergraduate and graduate students to work directly with CARB, as well as creating joint research programs.

**OASIS**

OASIS is a vision and strategy for focusing innovation-related activity in Inland Southern California, akin to "Biotech Beach" in San Diego and "Silicon Beach" in Los Angeles. As the name implies, innovations in sustainability, green technology and clean technology are cornerstones of the OASIS vision, along with community inclusion and social equity as core values.

A key, early manifestation of the vision is UC Riverside's OASIS project (Opportunities to Advance Sustainability, Innovation, and Social Inclusion), an innovation hub focused on the goal of creating a location—the nexus for an economic ecosystem—with facilities and living laboratories created to support research and to catalyze the creation of clean tech innovative startups.

UC Riverside's OASIS project is spearheaded by its Office of Research and Economic Development in collaboration with various research centers and programs in clean energy, clean transportation, agricultural technology, natural resource management, and social innovation. External government partners include the City and County of Riverside, Western Municipal Water District, California Air Resources Board, and South Coast AQMD, and a growing list of industry partners include AVL, SolarMax, and Southern California Edison. UCR's OASIS

will promote innovation and commercialization of key sustainability technologies, and work in tandem with the creation of a skilled workforce to fulfill the needs caused by technological changes, and the city's vision of making Riverside an international center for green and clean technology.

UCR's OASIS project involves the construction of a research park as well as an innovation engine that involves incubator activity and workforce development partnerships. The first phase of OASIS is to establish a sustainability research park anchoring diverse stakeholders collaborating in commercialization of the most promising innovations in clean energy, sustainable transportation, agriculture, and around mindful stewardship of natural resources. The OASIS Research Park will encompass research laboratories, incubator facilities, interactive training and community spaces. OASIS partners will create a skilled workforce to fulfill the needs caused by technological changes, prioritizing underserved populations. The OASIS Incubator is the innovation engine that will support entrepreneurs interested in the commercialization of sustainable technologies through access to capital, testbed facilities and specialized mentorship. OASIS will create an ecosystem of industry, government, community and academic partners to build consensus towards swift implementation of its vision. Full construction of the research park is still subject to securing financing, and will be built in Phases, with the first phase expected to be completed in 2025.

In addition to UCR's OASIS project, regional partners are exploring the OASIS concept to include other projects such as inclusive and sustainable economic development for Salton Sea communities and solar projects in the Coachella Valley area.

## CLEAN TRANSPORTATION IN SAN BERNARDINO COUNTY

The Redlands Passenger Rail Project is an advanced regional transportation project designed to connect residents, businesses and visitors to a variety of leisure, education, healthcare and other destinations. This nine-mile rail "Arrow" service rail project between the San Bernardino metro-link station and Redlands is capable of running on the same track as Metro-link trains, with future possibilities of direct connections between the University of Redlands, Esri, and Los Angeles Union Station.

In addition, the San Bernardino County Transportation Authority (SBCTA) is introducing a greener passenger rail future for the Arrow railway service by piloting zero-emission rail technology in 2024, with the first passenger train in North America running on electric battery and hydrogen fuel cells. SBCTA has also entered into negotiations with Elon Musk's "The Boring Company" to construct

## PROFILE

### COUNTY OF RIVERSIDE

**Representative:** Rob Moran

**Position:** Executive Director

Riverside County Business and Community Services (formerly known as the Riverside County Economic Development Agency) was established after a restructuring of the County's economic development agency. They focus on economic development, business attraction, retention and small business assistance efforts. "Small business services are our lifeblood in this entire region. We need to ensure that we have the sufficient support and network ecosystem to support them," says Director Rob Moran. Although the pandemic created unique challenges in the county, Rob noted some silver linings. In particular, the pivot to telecommuting and discovering that there is so much more that can be done with technology, even in non-tech sectors, to help them be more efficient and productive. Despite the flexibility that was demonstrated, many communities and populations did not have the same level of access to high-speed Internet or online services. "We still have to go into communities, we can't assume everyone will have Zoom or that we will reach everyone online," says Moran.

Key components of an innovative ecosystem include entrepreneurship innovation that can come from diverse sectors, not only limited to those in high tech spaces. Incorporating entrepreneurship and financial literacy at the K-12 level will also help support the next generation of innovators. "It's not just one entity," says Moran, "it's having an environment that encourages the exchange of ideas and transferring this information from one group to another. We need a support system to help folks engage." Despite the vast geography of the region, there are high levels of collaboration. These partnerships have been partly facilitated by technology that helps bridge the gap between different organizations. The region's increasing innovation ecosystem has also garnered attention from more established regions like Los Angeles and the Bay Area. Moran partly attributes this to the lower cost of living and business in the region, but more importantly, to the support system and activity that is happening in the region. The various incubators, the UC Riverside Bourns College of Engineering, UC Riverside's Office of Technology and Partnerships, CSU San Bernardino's innovative work, and the California Air Resource Board (CARB) project that are situated in the Inland Empire are all putting the region on the map.

a four-mile tunnel connecting Ontario Airport to the Rancho Cucamonga Metro-link station (Mass Transit 2021), and is exploring a partnership with XpressWest to connect the Rancho Cucamonga Metro-link station with the company's planned high-speed rail service between Apple Valley and Las Vegas (Sapien 2020).

### **OUR SALTON SEA: INVESTING IN PEOPLE FOR A THRIVING REGION**

Salton Sea communities have, for many years, struggled with air pollution emanating from water diversion from the region into more wealthy cities and more lucrative agricultural uses.<sup>7</sup> In addition, the communities surrounding the Salton Sea, in the counties of Riverside, Imperial, and San Diego, have found limited opportunities for economic mobility.

"Our Salton Sea" is a project led by Alianza Coachella Valley, with research support from the Center for Social Innovation (CSI-UCR) which seeks to design a vision and road map for resilient, inclusive, sustainable, and equitable development that honors community expertise and leverages the region's plentiful assets, including its human capital.

During the remainder of 2021, Our Salton Sea will convene a group of public and social policy professionals, applied researchers, community organizations and community members, to produce a set of research findings and recommendations that provide meaningful opportunities for economic mobility for residents with varying sets of skills and educational backgrounds. Importantly, the findings and recommendations will be shared throughout the course of the project, identifying opportunities to help inform investments by federal, state, and local entities in the context of economic recovery and reform.

### **LITHIUM VALLEY EFFORTS**

Building upon California's leading role in the nationwide transition to clean energy, there is the potential to develop what is being referred to as a "Lithium Valley" in Imperial County. Lithium Valley would draw upon opportunities for lithium recovery from the geothermal industry (itself a carbon-free source of energy) in the Salton Sea.

Because lithium is a key mineral for battery production, this known supply of lithium has the potential to be a pivotal resource in establishing a growing multi-billion dollar battery supply for electric vehicles in California. It would also mean significant job creation, investment, and overall economic development for the region, particularly in light of Covid-19-related economic recovery. According to a report from New Energy Nexus, lithium recovery from the geothermal industry in the Salton Sea

can anchor a sustainable domestic EV battery supply chain, injecting billions into the local and regional economy (Alston et al. 2020).

The California Energy Commission has stepped in as an angel investor, providing \$16 million in grants to a handful of companies to determine if it is technically and commercially feasible to extract lithium from the brine that geothermal plants are already pulling from the Salton Sea.

The project offers a unique intersection of two state priorities: increasing sources of renewable energy and encouraging new battery technology for electric cars and energy storage. In 2020, California Governor Gavin Newsom directed the state to ban all new gasoline-powered cars by 2035.

In terms of sustainable green technology, establishing a domestic lithium supply would help California meet its climate and emission reduction goals and establish the state as a source of a mineral designated by the federal government as essential to the nation's economic and national security.<sup>9</sup> The strategic value of lithium battery production is particularly high given the projected increase in global demand for transportation electrification. BloombergNEF noted that passenger EV sales increased from 450,000 in 2015 to 2.1 million in 2019.<sup>10</sup> The COVID-19 pandemic disrupted this trend, but the projected future trajectory is only on an upward slope as infrastructure continues to improve, battery prices drop, and new market sales increase. In addition, the potential for a Lithium Valley extends to general battery and electrical vehicle manufacturing, which in turn could lead to significant investment of private capital.

While the potential benefits from lithium extraction and battery production are considerable, it is also important for developers, researchers, and governments to take into account the needs, priorities, and expertise of local communities. Air pollution from the Salton Sea remains at levels that are hazardous to resident health, and the region has an important opportunity to use some portion of the anticipated profits from lithium and battery production to restore the Salton Sea as a place where all communities can live, work, and thrive.

At present, the state of California has created a Blue-Ribbon Commission on Lithium Extraction (via Assembly Bill 1657, Garcia), with 14 members appointed by the Governor, the state legislature, the California Energy Commission, and various state agencies. The commission is chaired by Silvia Paz, executive director of Alianza Coachella Valley, and will submit a set of findings and recommendations to the state by October 2022.

## CREATIVE ARTS & “PLACE-MAKING”

Another innovation-sector often overlooked is the creative arts. Broadly defined, this refers to the participation in a range of activities that allow for creative and imaginative expression, such as music and art. Importantly, innovations in creative art can be a catalyst for both economic and social development (Tremblay and Pilati 2013). For example, recently many cities have designated cultural or art districts which are meant to facilitate not only place-making identities, but encourage economic development surrounding the arts as well.

The first creative art in the Inland Empire was expressed by indigenous tribes and communities. Paintings and other pieces of art were used to tell stories, express creativity, and to reinforce cultural values and norms. This early art can be viewed at venues like the Ontario Museum of History and Art and the Agua Caliente Cultural Museum in Palm Springs.

In 1932, the San Bernardino Art Association was founded as a non-profit arts organization serving the multicultural art community of the Inland Empire. Art associations and other groups around this time, were an innovative way to pool resources and catalogue and support local artists.

The arts and cultural activity play an elemental role in defining community life. These place-making activities not only enhance human development, but also can help shape the social, physical, cultural and economic identity of a community, spurring economic development, and creating stronger social cohesion and community revitalization. Through this creative place-making, a community can revitalize and reinvest in marginalized communities.

### RIVERSIDE - CITY OF ARTS & INNOVATION

The City of Riverside is utilizing this type of creative place-making through their “City of Arts and Innovation” campaign. By designating and investing specifically in arts and innovation, the city is lifting up the creative assets it already has and facilitating and encouraging new expansion. For example, some new investments include the Cheech Marin Center for Chicano Art, Culture and Industry (opening Summer/Fall 2021), and the Riverside Food Lab, and the Riverside Convention Center expansion. Riverside Studios a collaboration with the County of Riverside will be a place for artists in the creative arts to train and develop their projects and to collaborate and network with industry representatives

### ART IN THE COACHELLA VALLEY

Coachella Valley is home to not only one of the biggest music festivals, but also home to a vibrant, active, and innovative art community. Local artists draw inspiration

## PROFILE

### CITY OF ONTARIO

**Representative:** Jennifer McLain Hiramoto

**Position:** Economic Development Director

Although Jennifer recently started her position as the Economic Development Director for the City of Ontario, she believes that the first steps in building a strong innovation ecosystem begins with identifying the strengths of industry sectors and sub-sectors in the community and capitalizing on those strengths. “We have to ask what does innovation mean and how does it improve the quality of life for the residents here,” she explains. Connecting education to the workforce needs is also an important priority. With so many educational institutions in the region, including UC Riverside, University of La Verne, Cal Poly Pomona, and the Claremont Colleges nearby, tapping into those resources and strengthening partnerships in order to build on the strengths of the local economies are important in building a foundation and solid infrastructure. Additionally, identifying physical spaces for people to innovate such as incubators, accelerators, hospitals, and airports among others are also necessary.

Engaging business partners and strengthening relationships are also important to establishing the infrastructure needed for innovation. “Who delivers the message is sometimes just as important as the message itself to attract the types of startups that are in your backyard,” says Jennifer. Areas of improvement include the need for more mentorship for entrepreneurs in the region. Identifying companies at various stages is important, including providing support and drawing out early-stage startup companies. “Peer-to-peer mentorship is so important in building up your innovation ecosystem,” says Jennifer, “We need more businesses willing to pay it forward because it is more meaningful coming from someone who has gone through the process.”

Currently, the City of Ontario has several ongoing innovative projects, including many smart city initiatives. For example, OntarioNet was the first municipally-led fiber network in the state of California. Ontario is also utilizing drones to map the city’s airspace. They are the first California city to map their skies. Investments in these types of projects helps to not only collaborate with local innovators, but to also mark the region as a place for new technological innovations. Ontario is a regional innovation hub, that boasts several company headquarters, with a specific cluster of e-commerce, manufacturing, and consulting.

## PROFILE

### COACHELLA VALLEY ECONOMIC PARTNERSHIP (CVEP)

**Representative:** Joe Wallace  
**Position:** CEO

The Coachella Valley Economic Partnership (CVEP) is a vital innovator of business development initiatives in the Coachella Valley. The partnership promotes a diversified economy by facilitating programs that stimulate job creation in key industries through business attraction, retention and expansion.

CVEP works to serve innovators and entrepreneurs at every stage of their business. For example, they have innovation hubs in Palm Springs, Palm Desert and Indio. The iHub focuses on early-stage businesses in the fields of renewable energy, health and medicine, and digital technology. The Palm Springs iHub also offers the Palm Springs Accelerator Campus – designed to mitigate start-up risks and increase the probability of businesses prospering and growing into the future. In addition, CVEP manages the Business Services Center and organizes professional training events throughout the region.

CVEP is also involved in establishing sufficient fiber to make broadband available throughout the valley and leading the effort to expand the CSU Palm Desert Campus. CVEP serves on the SCAG Technology council for broadband and hosts the CSU programs in cybersecurity and entrepreneurship in its Palm Desert iHub.

Due to the pandemic and the changing needs of the business community, CVEP has had to shift its focus over the past year. “We pivoted from mostly incubation and entrepreneurship to helping businesses access and manage relief programs like the PPP and EIDL loans”, says CEO Joe Wallace. For example, CVEP was granted about \$3 million worth of PPE and sub granted that to the business community through partnerships with the 9 cities and chambers.

In terms of the future, CVEP has started to look at more macro level opportunities in the Coachella Valley. “We have begun to do scholarly studies on the big needs of the Coachella Valley like bandwidth, a comprehensive university, the environmental issues at the Salton Sea and diversification of the local economy. Our future efforts will concentrate on big issues and innovation”, says Joe.

from the demographic and geographic diversity the valley has to offer. Architects, designers, and artists collaborate to bring creativity center stage in the city. Recently, Desert X collaborated with brilliant artists to create an outdoor art installation. This project is one that only occurs every other year and is meant to help the community envision a new future.

## HEALTH CARE & DELIVERY

Another notable innovation sector in the Inland Empire is healthcare and healthcare delivery. This sector includes teaching hospitals, schools of medicine, and other healthcare providers.

The Riverside University Health System (RUHS) - Medical Center was founded in 1893, the same year Riverside County was established. After going through many iterations and changes, the RUHS currently provides health services all over Riverside County, including community wellness efforts and medical education. In addition, RUHS specializes in teaching the next generation of health experts along with clinical research.

Loma Linda University also was established around this time, in 1905. Beginning as a medical school for Seventh-Day Adventists, LLU has expanded and grown into a notable medical center and research institution. The university comprises eight schools and the Faculty of Graduate Studies offers more than 100 degree and certificate programs. In 2008, LLU was a part of a half a million dollar grant to explore partnerships with private sector companies looking to utilize intellectual property and bio-technology from the university.

Currently, Loma Linda University is a globally recognized university, encompassing eight schools teaching the next generation of healthcare providers. LLU has partnerships with six nearby hospitals for focused hands-on training. More than 100 health sciences programs with varied education options, including distance learning, certificates of completion and degrees from associate to doctoral. Additionally, they have many ongoing research efforts supported by over \$25 million in awards.

UC Riverside is also involved in healthcare research and teaching. The UCR School of Medicine was built on the foundation of the former UCR/UCLA Thomas Haider Program in Biomedical Sciences, which had been in place since 1974. The school was established as part of an effort to address the serious doctor shortage in the Inland Empire, enrolling its first students in 2013. The region faces a critical shortage in both primary-care and specialist physicians. Recently, Governor Gavin Newsom unveiled a \$222.2 billion budget proposal that allocates additional ongoing funding of \$25 million to expand enrollment and increase operational support for the UC Riverside School of Medicine. The additional funding would enable the

medical school to double the number of medical doctors in training. Many would serve residencies, and perhaps later pursue careers, in inland Southern California. In March 2021, approval was gained for a new LEED-platinum Education Building which will have an urban downtown design theme and enable class sizes of up to 125 students.

In terms of healthcare delivery, the Inland Empire Health Plan or IEHP, has been instrumental in the region in facilitating healthcare access and health education. IEHP was created in 1996 to assist MediCal members in the Inland Empire. The mission of the organization is to organize and improve the delivery of quality, accessible and wellness based health care services for the region. Since 1996, IEHP has grown to serve over 1.2 million residents in Riverside and San Bernardino County. IEHP has been recognized locally and nationally for innovation, excellence, and providing access to care for low-income residents in the Inland Empire.

## INFORMATION TECHNOLOGY

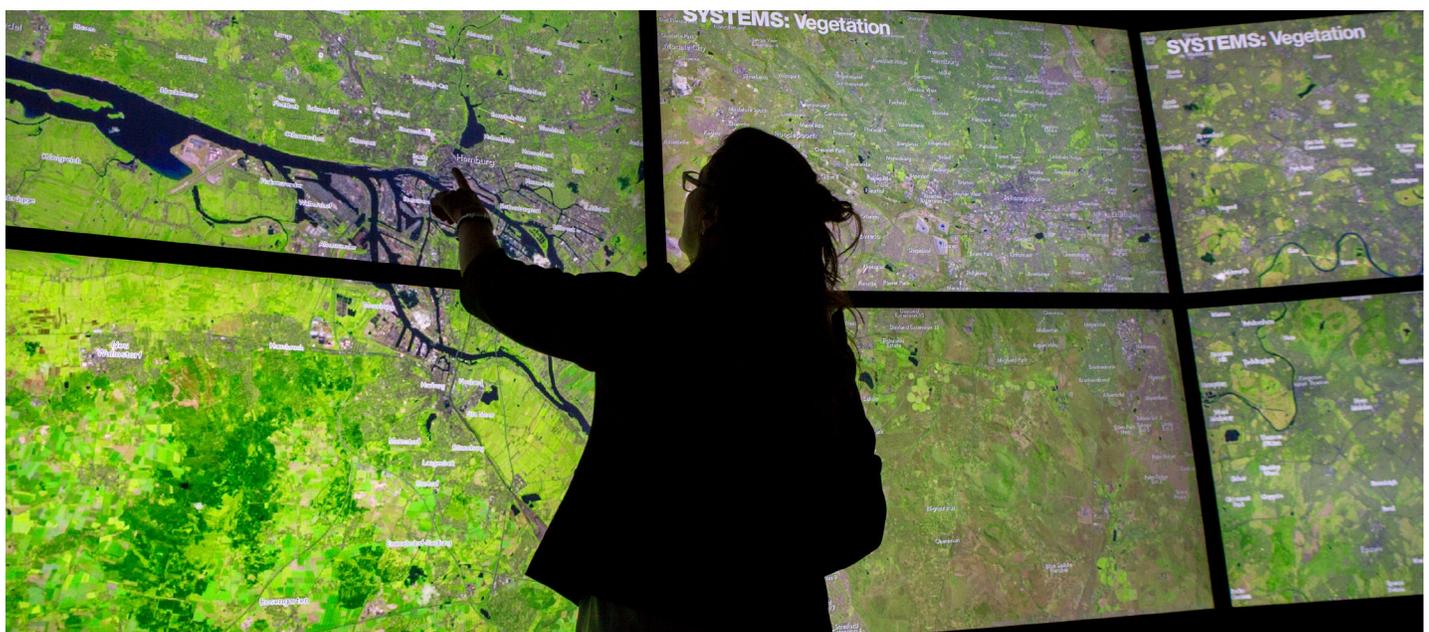
Information technology involves the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data. The capabilities and design of computers developed rapidly through the forties and fifties, with the first office application appearing in 1951. During these early days of info tech, computers were mainly utilized on military bases and universities in the Inland Empire.

A notable exception to this was the private company Esri, founded in Redlands in 1969. Although Esri was originally founded as a land-use firm, the company

is known for its technological innovations in mapping software. Esri is now an international supplier of geographic information system (GIS) software, and web GIS and geodatabase management applications. In 2016, Esri's annual revenues totaled \$1.1 Billion, from 300,000 customers. Esri and the City of Redlands are working together to create a tech hub surrounding the Esri campus. Esri has also launched the Esri Startup Support Program. This global 3-year program helps startups build mapping and location intelligence into their products and businesses. The program provides access to Esri online services, software, development tools, ready-to-use content, training, support, and co-marketing opportunities

The company has also played a significant role in place-making in the City of Redlands, subsidizing the cost of the Redlands Rail project (see p. 18) by paying for the construction of a station stop at its campus (Emerson 2015). In addition, Esri founders Jack and Laura Dangermond are major investors in Property One, which is financing the construction of a "packing house district" complex in central Redlands featuring the revamping of a historic train depot, retail, dining, and office space (Folmer 2020).

Another notable info tech innovator in the region is the CyberSecurity Center at California State University, San Bernardino (CSUSB), a national leader in cybersecurity education. The university has been designated as a Center of Academic Excellence in Information Assurance by the National Security Agency and the Department of Homeland Security since 2008. Business Administration with a Cybersecurity concentration was one of the first cybersecurity tracks in California. The National Security





Source: California State University, San Bernardino

Studies master of arts program is a nationally renowned, two-year program that offers a comprehensive curriculum for students interested in pursuing careers in national service. It is one of three such programs in the country and the only one in the California State University system.

In 2020, the National Security Agency (NSA) has chosen Cal State San Bernardino to be a leader of its core workforce development initiative, selecting it for a \$10.5 million grant and naming the university's Cybersecurity Center as the Community National Center for Cybersecurity Education.<sup>12</sup>

Additionally, the National Science Foundation awarded \$749,869 to Cal State San Bernardino as part of a \$4.3 million grant to recruit and mentor 30 students from five community colleges to ultimately work in cybersecurity in federal agencies and departments.<sup>13</sup> The program was designed to increase the level of diversity among students enrolled in cybersecurity programs and allow members of underrepresented communities to engage in the field.

## SOCIAL INNOVATION & SOCIAL IMPACT

The term social innovation often refers to new social practices that aim to meet social needs in a better way than the existing solutions, resulting from - for example - working conditions, education, community develop-

ment or health. These new solutions are more effective, efficient, sustainable, than existing solutions. These new ideas are created with the goal of strengthening society, often with an emphasis on equity, serving historically disenfranchised communities. Social innovation is a crossover sector that can occur in any standard industry sector. Below are some examples of projects and initiatives that have significant social impact and innovation within the region.

### COACHELLA VALLEY CATALYST FUND

Lift to Rise, in partnership with Riverside County's Housing Authority and nine Coachella Valley cities, a group of stakeholders put forward a vision of producing 10,000 affordable housing units over the next 10 years through the Housing Stability Collaborative Action Network

To achieve this goal, the network convened the Coachella Valley Housing Catalyst Initiative, out of this initiative came the Coachella Valley Housing Catalyst Fund. The fund is a source of flexible, favorably priced capital for community development projects. The fund will finance a current pipeline of \$800 million in projects, and 2,000 housing units.

In the past, housing investments on a project by project, or city by city basis, have left regions short. Lift to Rise started by engaging with the local community, ensuring community buy-in and sustainability. The fund has the

ability to immediately begin projects and could serve as a model for the rest of the state.

### INLAND EMPIRE COMMUNITY COLLABORATIVE (IECC)

The IECC is a local collaborative with the goal of making Inland Empire nonprofits more innovative, resource rich, and sustainable. IECC got its start with a capacity-building investment from First 5 San Bernardino. It now receives support through county contracts and giving from private foundations and individual donors, going from an annual budget of \$50,000 to \$1.2 million within three years.

IECC supports local capacity building in various innovative ways, with the ultimate vision of making the region more adaptable and equitable. For example, it has developed a train-the-trainer model using successive cohorts called Capacity Building Academy where they provide sustainability planning for nonprofits in San Bernardino and Riverside counties. IECC is also working to drive more inclusion and equity in nonprofit sector leadership and financing, which is critical for a region where residents and nonprofit clients are overwhelmingly people of color.

### CARAVANSERAI PROJECT

Caravanserai Project was founded in 2016 with the purpose of supporting mission-driven entrepreneurs and ventures along their journeys to advance their mission and increase their social impact. The organization has designed and delivered programs that focus on shifting mission-driven organizations, for profit and nonprofit alike, from a transactional mindset to a transformational one through long-term sustainable planning, the adoption of a lean organizational infrastructure, the development of strong accountability, monitoring and measuring mechanisms and supporting futures-thinking leadership.

Caravanserai Project's Social Entrepreneurship Engagement and Development Lab (SEED Lab) is an 8-month social impact pre-accelerator for early stage mission-driven start-ups providing entrepreneurial training and leadership support. Participants in the SEED Lab receive a Specialized Certificate and 9 professional credits awarded by the University of California, Riverside - Extension. More recently, Caravanserai Project received a grant from the IE COVID-19 Resilience Fund through the Inland Empire Community Foundation to offer technical assistance and capacity building support to nonprofit organizations as they were navigating the COVID-19 pandemic.

Caravanserai Project's approach is innovative as it supports mission-driven leaders and organizations to adopt techniques from the for-profit sector and develop sustainable business models that enables them to stay relevant and be able to acquire the necessary resources to implement long-term and irreversible system change.

## PROFILE

### INLAND EMPIRE/DESERT REGIONAL CONSORTIUM

**Representative:** Lisa Kiplinger-Kennedy  
**Position:** Regional Director for Business and Entrepreneurship

The Inland Empire/Desert Regional Consortium (IEDRC) serves as a regional framework to communicate, coordinate, collaborate, promote and plan career and technical education and workforce and economic development in the Inland Empire/Desert Region. IEDRC partners work to provide the region with workforce development programs that address the real needs of local communities and contribute to economic prosperity for the region.

Lisa is the Regional Director for Business and Entrepreneurship at IEDRC. She sees her position as the central link between industry and education, representing the community colleges in the Inland Empire. She works together with these stakeholders to improve and expand the business and entrepreneurial curriculum to help create a job-ready workforce and innovative entrepreneurial leaders that can ensure the region's economic growth and competitiveness.

With a focus on innovation, the IEDRC is actively creating maker spaces and innovation centers across almost all Inland Empire community colleges. These maker spaces and innovation centers were all uniquely developed and designed to meet the needs and demands of the local community. For example, Barstow College located their innovation center in the same building as the Veteran Center, with hopes that students across all ages and backgrounds could collectively innovate.

Lisa believes that there has been noticeable progress in establishing community coalitions in the region, however, more needs to be done. Lisa hopes to find a model for community involvement and engagement that brings together community, industry, and education stakeholders. It is only with partnerships like these that we can ensure that the educational pathways offered to students are on pace with innovative business models and the industry talent pool needs.

## RIVERSIDE FOOD SYSTEMS ALLIANCE (RFSA)

The Riverside Food Systems Alliance is a regional nonprofit including many diverse regional stakeholders. The mission of the RFSA is to carry out the Riverside Food Policy Action Plan, which is a comprehensive plan for building a sustainable and resilient regional food system. Through RFSA, there are many efforts underway working to build up local and regional food system capacity including. The Riverside Food Systems Alliance (RFSA) is the community-based, nonprofit partner that helps plan, promote, and produce the annual GrowRIVERSIDE conference, technical workshops and Growers' Forums. For example:

**The NextGen Farmer Training Program** – critical workforce program; a region cannot have a food system without farmers. The average age of the farmer is 65+; the program is intended to provide vocation-based new farmer training, emphasizing regenerative/sustainable agriculture and entrepreneurship.

**RUSD Food Hub** – the first of its kind in the nation, the RUSD food hub leverages a school district's Nutrition Services facilities to function as a regional food hub to connect regional farmers to regional clients, while also increasing farm-to-school purchases.

**Northside Heritage Meadows Project** – The NHM project will be the first urban agriculture project in Riverside's disadvantaged Northside neighborhood. The neighborhood is considered a "food desert" according to the USDA Economic Research Service. A nearly \$3M Urban Greening Grant has been awarded to the City of Riverside to purchase over 7 acres of blighted farmland. This project will be a collaboration of the Northside community, the Riverside Food Systems Alliance (RFSA), local groups, agencies and the City of Riverside. Additional in-kind and matching funds by various partners will be leveraged to complete the multiple components

**Market Match** – RFSA is coordinating the Market Match Program for local farmers markets. This gives our families participating in CalFresh (SNAP) the option of purchasing local, fresh, nutritious fruits and vegetables with an additional \$10 to match \$10 spent. The program empowers SNAP customers to make healthy food choices, and benefits our small and mid-size local farmers. Find Market Match programs at the Tyler Galleria, San Jacinto, and Banning Farmers Markets.

There are more than two dozen partners (including government, NGOs, CBOs, education, community members, healthcare, local business, others) at the table working together to address the food system opportunities, both downstream and upstream. RFSA partners are collaborative and intentional in addressing economic, social, and environmental challenges with a sustainability and equity lens.

## MICRO-ENTERPRISE HOME KITCHENS

Riverside County was the first county in California to fully implement California Retail Food Code AB-626, which allows chefs to make and sell limited amounts of food for the public in their home, allowing the operation of Micro-enterprise Home Kitchens.

A Micro-enterprise Home Kitchen Operation (MHKO) is a food facility that is operated by the resident(s) of a private home. Food can be stored, prepared, and served to customers at the MHKO.<sup>14</sup> The newly implemented regulation allows anyone to run a licensed restaurant out of their home kitchen and dining room. No commercial space, no food truck, no ghost kitchen, and no staff is needed.

This small change to the law is set to have major impacts, especially considering stay-at-home mandates, high unemployment, and other effects from the coronavirus pandemic. The innovative opportunities presented by AB-626 could mean serious benefits not only for the local economy, but also in addressing food deserts in the Inland Empire. AB-626 gives local chefs the opportunity to feed their communities the food that they want.

## INNOVATIONS IN YOUTH & RACIAL EQUITY WORK

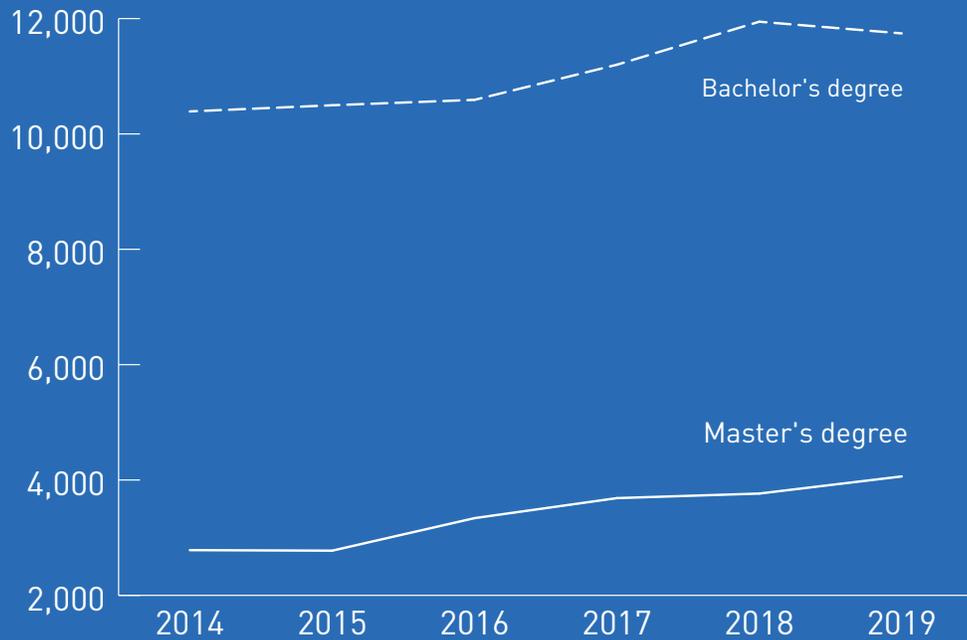
The Inland Empire is home to a number of innovative nonprofit organizations focused on youth education and equity work. For example, past reports by the Center for Social Innovation have highlighted the innovative work of social enterprises such as Youth Mentoring Action Network that relies on a mix of grant funding, contracts, and consulting work to advance critical youth mentoring work that is nationally recognized. Similarly, Music Changing Lives provides music, art, and tutoring programs in public schools and community centers while raising awareness about the importance of enrichment programs as part of each child's comprehensive education and lifestyle. In addition, immigrant-serving organizations such as TODEC Legal Center, and immigrant-serving coalitions such as Inland Coalition for Immigrant Justice and Alianza Coachella Valley have expanded their work from advocacy and civic engagement to mutual aid and cash assistance during the pandemic.<sup>15</sup>

### Black Equity Initiative

The Inland Empire Black Equity Initiative (IE BEI) is a project born out of the strategic mobilizing efforts and convening of 10 community based organizations from San Bernardino, California. The initiative seeks to expand efforts to identify and implement culturally relevant and responsive pedagogy as a crucial component to Black student success. Their work extends the progress of the Targeted Instructional Improvement Policy (TIIP), a policy adopted in the region to hold schools and

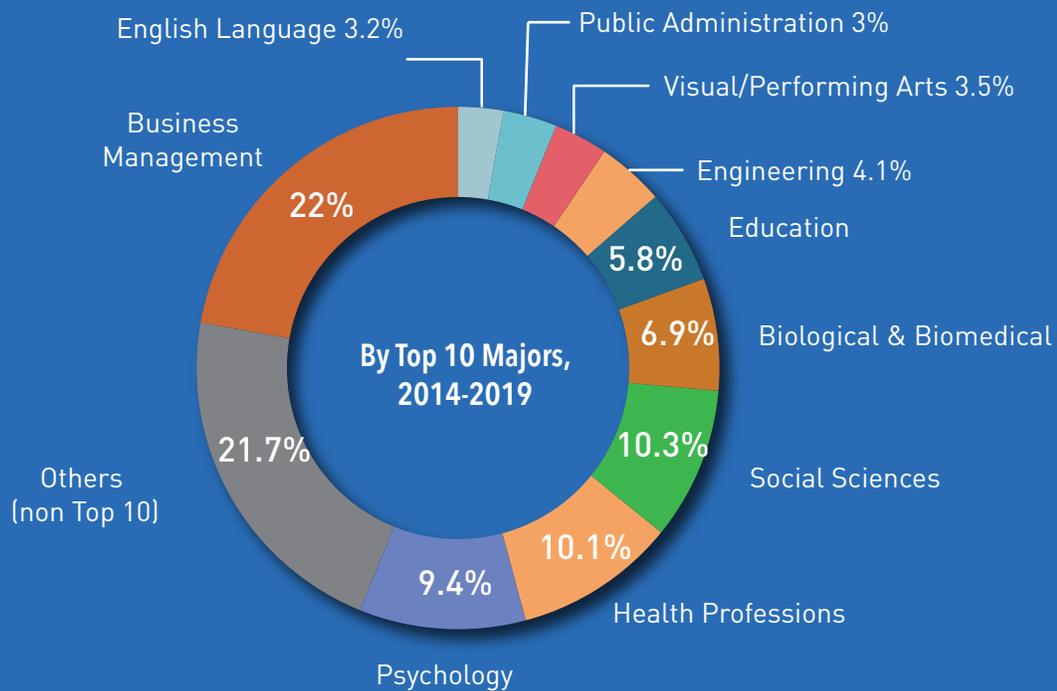
# Data Snapshot

**FIGURE 4 - DEGREES AWARDED BY INLAND EMPIRE UNIVERSITIES**



Source: CSI-UCR analysis of IPEDS 2014-2019)

**FIGURE 5 - SHARE OF GRADUATING STUDENTS IN THE INLAND EMPIRE**



Source: CSI-UCR analysis of IPEDS 2014-2019)

**TABLE 1 - INNOVATION SECTOR JOB POSTINGS BY REGION OVER TIME**

	2016	2017	2018	2019	2020	% Change 2016-2020
<b>Inland Empire</b>	151,235	145,662	230,537	252,178	284,409	88.1%
<b>Riv. Co.</b>	73,232	69,427	110,301	116,593	127,467	74.1%
<b>SB Co.</b>	78,003	76,235	120,236	135,585	156,942	101.2%
<b>Rest of SoCal</b>	304,486	293,341	463,092	506,375	570,838	87.5%
<b>CA State</b>	2,422,052	2,324,093	3,357,426	3,841,885	3,583,069	47.9%

Source: CSI-UCR analysis of Burning Glass Technologies data  
See Appendix for classification methodology

**TABLE 2 - TOP 10 INNOVATION CLUSTER AREAS**

Rank	Region	Number of Headquarters
1	Riverside	281
2	Ontario	249
3	Temecula	237
4	Corona	198
5	Rancho Cucamonga	193
6	Chino	127
7	Murrieta	109
8	Palm Desert	96
9	Lucerne Valley	95
10	Redlands	88

**TABLE 3 - STEM DEGREES CONFERRED IN THE INLAND EMPIRE, 2019**

	Bachelor	Masters
<b>Hispanic</b>	1,078 (36%)	64 (14%)
<b>Asian</b>	958 (32%)	68 (14%)
<b>Black</b>	102 (3%)	10 (2%)
<b>White</b>	542 (18%)	127 (27%)
<b>Other Race</b>	237 (8%)	24 (5%)
<b>International</b>	103 (3%)	180 (38%)
<b>Men</b>	1,625 (54%)	305 (64%)
<b>Women</b>	1,400 (46%)	169 (36%)

Data source: IPEDS 2014-2019)

Share of total in parentheses

Source: Crunchbase 2020, Analysis by Blended Impact

**FIGURE 6 - MAP OF FIRM HEADQUARTERS IN CRUNCHBASE**



Source: Crunchbase Data, Analysis by Blended Impact

**TABLE 4 - TOP 20 INDUSTRIES IN THE INLAND EMPIRE**

Rank	Industry	Count of Organization	Rank	Industry	Count of Organization
1	Consulting	121	11	Financial Services	43
2	Health Care	110	12	Computer	40
3	E-Commerce	108	13	Education	40
4	Advertising	104	14	Building Material	40
5	Manufacturing	100	15	Accounting	38
6	Construction	77	16	Banking	33
7	Automotive	71	17	Consumer Goods	32
8	Information Technology	62	18	Commercial	31
9	Real Estate	56	19	Electronics	31
10	Food and Beverage	54	20	Industrial	26

Source: Crunchbase 2020, Analysis by Blended Impact

**TABLE 5 - TOP 10 INVESTORS IN THE REGION**

Rank	Industry	# of firms supported	Rank	Industry	# of firms supported
1	Tech Coast Angels	5	6	CVF Capital Partners	2
2	Newchip	4	7	Lighter Capital	2
3	Creative Destruction Lab	3	8	Serruya Private Equity	2
4	Fulmer Capital Partners	3	9	StartEngine	2
5	500 Startups	2	10	Techstars	2

Source: Crunchbase 2020, Analysis by Blended Impact

**TABLE 6 - PRIVATE ANCHOR ENTITIES WITH HEADQUARTERS IN THE INLAND EMPIRE**

Organization Name	Headquarters Location	Main Industry	Estimated Revenue Range
Esri	Redlands	3D Technology	\$1B to \$10B
Stater Bros	San Bernardino	Food and Beverage	\$1B to \$10B
Intco Recycling	Chino	Manufacturing	\$1B to \$10B
Tarbell Realtors	Riverside	Real Estate	\$1B to \$10B
Prime Healthcare Services	Ontario	Health Care	\$1B to \$10B
Safariland	Ontario	Retail	\$500M to \$1B
Bourns	Riverside	Electronics	\$500M to \$1B
Eisenhower Medical Center	Rancho Mirage	Biotechnology	\$500M to \$1B
CO-OP Financial Services	Rancho Cucamonga	Financial Services	\$500M to \$1B
Reliant Foodservice	Temecula	Consumer Goods	\$500M to \$1B

Source: Crunchbase 2020, Analysis by Blended Impact

administrators accountable to actively engaging with the needs of Black students.

Since establishing a guiding educational report, the IE BEI has used its findings to make recommendations to education decision-makers and practitioners. Throughout the years, the initiative has mobilized coalitions for civic advocacy by meeting with elected officials and have organized successful media campaigns. Recently, in the height of the summer 2020 Black racial reckoning, the BEI won a declaration to deem racism a public health crisis in San Bernardino, the first in the state of California to do so. Other counties followed, which further illuminates the leadership and vision of the organization.

Related to the initiative, equity-focused leaders in the Inland Empire mobilized quickly during the racial reckoning of summer 2020 to create a Black Equity Fund that set an ambitious standard for the region on fundraising to support Black-Led Organizations and implemented principles of Trust-Based Philanthropy that give a large degree of control to community coalitions to self-determine how pooled funds should be utilized (Bharath 2000). These plans were co-designed by Congregations Organized for Prophetic Engagement, BLU Educational Foundation, Inland Empire Funders Alliance, Inland Empire Community Foundation, and The California Endowment, with strategic research support from the Center for Social Innovation (CSI-UCR). So far, the Black Equity Fund has already raised half of its goal of \$5 million over a two-year period, several months ahead of schedule.

### **CENTER FOR SOCIAL INNOVATION**

The Center for Social Innovation, founded in February 2018, has attracted public and philanthropic investments to the region by providing a credible research voice that spurs civic leadership and policy innovation. The Center's reputation is built on the key pillars of social science, strategic policy awareness, innovation-oriented mindsets, and deep community partnerships. CSI integrates researchers, community organizations, and civic stakeholders in collaborative projects and long-term partnerships that strengthen shared values of resilience, inclusion, sustainability, and equity (RISE). Importantly, the Center seeks to shift away from a "problem" narrative to an "opportunity" narrative for marginalized communities and localities. Its collaborative work with community and government partners has helped to secure over \$12 million in public and private funding that advance inclusion and equity in the region, including support for Census outreach, inclusive economic development, and grant-making partnerships with Black-led Organizations for 2020 and beyond.

Since the onset of COVID-19, the Center has worked with community partners on a variety of projects that advance inclusion and equity.

1. IE COVID Response, a weekly meeting of non-profit leaders, state and local government agency officials, and foundation program officers with a focus on inclusion and equity in the wake of the pandemic. This is a learning space, a caring space, a networking space, and an agenda-setting space where we have enabled nonprofit leaders in the region to deepen their awareness and commitment to racial equity, immigrant justice, and youth voice. We generated the idea behind this collaborative effort with the Inland Empire Community Foundation, and have secured the regular participation of the Office of Governor Newsom and representatives from Riverside and San Bernardino Counties.
2. IE Black Equity Initiative and IE Black Equity Fund: The Center move quickly and responsively after the murders of Breonna Taylor and George Floyd to assist IE Black-led organizations, including Congregations Organized for Prophetic Engagement and BLU Educational Foundation, in their efforts to dramatically increase investments in Black-led Organizations (BLOs). CSI-UCR was invited by these organizations to furnish talking points, demographic data, and framing strategies, which the organizations then used to successfully build a \$5 million Black Equity Fund in collaboration with the Inland Empire Funders Alliance, Inland Empire Community Foundation, and CSI-UCR.
3. IE RISE: Since the summer of 2018, CSI and its civic engagement partners had envisioned 2020 Census outreach as building a foundation of civic capacity that would form the basis of post-Census equity work. In early 2020, CSI and Inland Empowerment partners came up with a framework for this work, the Inland Empire Road map for an Inclusive and Sustainable Economy or IE RISE. Census outreach partners then created a governance and work plan from this framework, and invited CSI to be a strategic research partner in the work.
4. Census Legacies: IE RISE was an early demonstration project, of ways that the civic infrastructure of Census outreach tables can be built upon and leveraged, rather than torn down and started anew every few years. Once community partners in the Inland Empire had taken more ownership of IE RISE, CSI undertook the task of spreading and adapting the model elsewhere, under the rubric of "Census Legacies." In 2021, CSI will be supporting the post-Census work of inclusion and equity in various Southern California counties, and nationally in partnership with the Leadership Conference.

5. Civic Infrastructure: Related to its work on IE RISE and Census Legacies, CSI is focusing on developing a framework of civic infrastructure—assets and relationships involving community media, nonprofits, academic institutions, government agencies, and philanthropy—that can help theory inform practice in two timely issue priorities:

a) Vaccine outreach through the Tri-County Community Partnership involving Imperial, Riverside, and San Bernardino Counties, along with trusted community messengers. This partnership leverages key principles and insights from census outreach, including community co-design and cross-sectoral collaboration to inform vaccine outreach in historically disenfranchised communities

b) Building a stronger community media partnership based on 2020 Census collaborations. CSI-UCR has helped to incubate the IE Media Roundtable, a regional collaborative effort led by Tzunu Strategies and Voice Media Ventures that includes over 20 local media and ethnic media outlets and aims to elevate the stories and accomplishments of communities of color that represent about 70 percent of the region's residents.

Finally, the Center is developing innovative frameworks that provide greater clarity and accountability for post-pandemic projects, initiatives and investments. Through its research, community learning sessions, and local community engagement work, the Center is developing a *RISE and Ready* investment and project framework, which seeks to improve over standard definitions of “shovel-ready” projects. The *RISE* (Resilience, Inclusion, Sustainability, Equity) aspect of the framework includes a set of measurable standards to track progress on key values and priorities, while the *Ready* aspect of the framework measures a community's workforce and infrastructural readiness, with respect to receiving new investments and completing projects in a timely manner.

## EDUCATION AND WORKFORCE

The strength in science, technology, engineering, and mathematics (STEM) disciplines have formed the basis of innovations, technologies, and industries that have spurred the regional economic growth throughout the history of the state of California and the Inland Empire.

Universities are essential to the creation and transfer of new knowledge that drives innovation. This knowledge moves out of the university and into broader society in several ways – through highly skilled graduates (i.e. human capital); academic publications; and the creation of new products, industries, and companies via the

commercialization of these scientific breakthroughs. Examples of this can be found throughout this report. The relationship between education, the workforce, and industry is the engine that drives innovation in the region.

The Riverside STEM Academy (RSA) is a good example of early education focused on some of the innovation sectors we highlight in this report. RSA is a Riverside Unified School with a focus on Science, Technology, Engineering, and Math (STEM) serving grades 5-8, with extension plans to include a STEM High School. Started in 2011, the school puts an emphasis on research and product-based learning. RSA has close ties with UC Riverside and is developing partnerships with other local universities and colleges, community organizations, and STEM related businesses.

The work of Growing Inland Achievement (GIA) also highlights this connection with education, the workforce, and industry. GIA focuses on regional educational policy initiatives via a cradle-to-career model, including increasing baccalaureate, associate, certificate, and credential attainment by 15% within 5 years; increasing baccalaureate graduation by 10%; and improving career preparedness through strengthened industry partnerships.

GIA has many projects and initiatives that focus on STEM. There are college prep programs, such as Promise Scholars, Magnify the Middle (at Riverside County Office of Education), and the Minority Teacher Pipeline, that all focus on encouraging students in STEM. GIA in collaboration with Barstow Community College are working on a particularly innovative project called the Creative Confidence for Opportunity Youth program. The population this project will target are K-12 students from the two local junior high schools (Barstow Junior High and the Barstow STEM Academy). 21% of the students at Barstow Junior High and 5% of the STEM Academy are African-American. This project targets the African-American students, particularly the male students to support in the development of their creative confidence and in their abilities to innovate and create. This project can serve as a model for other rural cities in California.

One Future Coachella Valley (OFCV) does similar work in the Coachella Valley. Founded in 2005, OFCV is a cradle-to-career initiative working to advance a regional plan to increase high school, college, and higher skills training completion, college and career readiness, and the number of local students with higher wage jobs. They do this through a variety of projects and initiatives including (1) career pathways and academies, (2) leadership engagement, (3) scholarships and financial aid, and (4) experiential learning.

## CALIFORNIA STATE UNIVERSITY SAN BERNARDINO (CSUSB) – SCHOOL OF ENTREPRENEURSHIP

CSUSB is home to the first and only School of Entrepreneurship in California. Recognized by AACSB International (the world's leading accreditation body for business schools) as a Top 35 Program for Entrepreneurship and Innovation, the School delivers and coordinates a wide range of undergraduate (BA) and graduate degree (MS, MBA) programs in Entrepreneurship, including a newly launched Master of Science in Entrepreneurship and Innovation (MSEI). The School has 17 faculty teaching approximately 300 students studying entrepreneurship annually, including specialized programs in the Arts and Sciences. The School, in collaboration with the University's Inland Empire Center for Entrepreneurship (IECE), operates a campus-based accelerator to support the growth and development of innovative student and faculty startups.

In terms of workforce development, recently the California Workforce Development Board announced a new grant that targets the Inland Empire to support the development of high quality jobs and workforce training opportunities for essential workers in logistics industries. The \$1.3 million dollar grant was awarded as part of the High Road Training Partnerships program (H RTP).<sup>16</sup> The awarded project is led by the Inland Empire Labor Institute, the International Brotherhood of Teamsters, and the Warehouse Worker Resource Center.

These partners will convene workers, employers, community leaders, and environmental groups to create the High Road Logistics Training Center and develop a new vision for economic development in the region that focuses on high quality sustainable jobs for local residents, clean air, and a clean environment. This work will link multiple industries in logistics and related work, including trucking, warehousing, electric vehicle operations and maintenance, electric vehicle charging infrastructure, building decarbonization, and energy efficiency.

The California Air and Resources Board (CARB) has had a longstanding partnership with UC Riverside (as noted on pg. 16 with CE-CERT). In 2019, the relationship was formalized with a signed agreement to work with faculty and students at UC Riverside to advance research and inspire students at all levels to learn more about air quality, the impacts of climate change, and CARB's efforts to clean the air.<sup>17</sup>

In its agreement, the University of California, Riverside notes how both CARB and UCR can leverage their facilities and staffing resources to conduct air quality and climate change research. The agreement is particularly important as CARB prepares to move its Southern California headquarters from El Monte to Riverside in 2021. When completed, the state-of-the-art, 380,000-square-foot building will be home to one of the largest and most advanced vehicle emissions testing and research facilities in the world, offer-

## PROFILE

### EPIC SMALL BUSINESS DEVELOPMENT CENTER (UC RIVERSIDE)

**Representative:** Scott Brovsky  
**Position:** Director of EPIC SBDC

EPIC SBDC works to validate and accelerate the transformation of ideas and inventions into products or services for the marketplace. They identify promising startups, provide mentors with different skill sets, help find C-Level talent and help raise non-dilutive funding and equity capital. "We focus on helping to grow companies that will stay in the region and create high paying jobs," says Scott. EPIC SBDC also supports the ExCITE and life sciences incubators, both connected to UC Riverside, as well as community startups. This work has been instrumental in growing the startup ecosystem in the region.

Scott believes that there are several components that are key in building the tech ecosystem in the Inland Empire. Having the support of research universities like UC Riverside and Loma Linda University provide a wealth of resources. Cultivating talent is also an important component, one that has often been a challenge in this region. "A company may start here and get traction, but they leave because they can't find the talent. We need to give students interested in entrepreneurship a reason to want to stay in the region," says Scott. Access to capital has also been a challenge in the region, particularly because of the lack of angel investors that are crucial in helping to build tech companies. Until there are more investors in the region, there will be continued pressure for startups to leave, the only way to counteract that is to get funding and talent from the IE.

Scott believes that the Inland Empire can position itself as a place of innovation by focusing on key verticals, such as agricultural technology, clean tech, biotech, and medical device technologies. "We need to be known for a few things, we can't be all things to all people," explains Scott.

**TABLE 7**  
**TOP 10 INLAND EMPIRE REGIONS FOR GRANTED PATENTS**

Rank	Region	Patents Granted	Rank	Region	Patents Granted
1	Riverside	412	6	San Bernardino	93
2	Corona	398	7	Temecula	86
3	Ontario	256	8	Palm Desert	69
4	Rancho Cucamonga	239	9	Chino	28
5	Lucerne Valley	182	10	Hemet	26

Source: Crunchbase 2020, Analysis by Blended Impact

**TABLE 8**  
**TOP 10 COMPANIES BY # OF TRADEMARKS REGISTERED**

Rank	Organization Name	Headquarters Location	Main Industry	Trademarks Registered
1	Monster Energy	Corona	Beverage	591
2	Microflex	Riverside	Manufacturing	358
3	Safariland	Ontario	Retail	180
4	K&N Engineering	Riverside	Automotive	176
5	Bradshaw	Rancho Cucamonga	Computer	167
6	Partners in Leadership	Temecula	Consulting	118
7	Edgewood Partners Insurance Center	San Francisco	Consulting	60
8	Minka Group	Corona	Consumer Goods	51
9	Evolution Fresh	Rancho Cucamonga	Beverage	50
10	Bourns	Riverside	Electronics	40

Source: Crunchbase 2020, Analysis by Blended Impact

ing multiple opportunities for local students to engage in internships and research.

Another important STEM development at UC Riverside was the first convening of R-Ladies Riverside in October 2019. R-Ladies is a worldwide organization that promotes gender diversity in the R programming language community. R-Ladies Riverside is open to the public and provides workshops and training focused on empowering and educating women. Although women are participating more in R than other languages, according to an R consortium study only 14% of R users are women. R-Ladies Riverside seeks to address this imbalance through formal workshops as well as informal peer-to-peer style environments.

## LOCAL GOVERNMENT INITIATIVES & PROGRAMS

The concept of an innovation ecosystem is built on knowledge creating and sharing across companies, knowledge institutions, governments (policy), business enterprises and industry boundaries. Innovation often stems from collaboration between government, universities, industry, and research.

Government plays an important role in promoting innovation at various stages. While federal and state governments often create the policy and regulations that directly impact the innovation ecosystem on a macro level, local governments are able to have significant impacts locally through a variety of locally focused policies and collaboration between stakeholders.

### RIVERSIDE INNOVATION DISTRICT

Partially in response to persistent local brain drain, the Riverside Innovation District was conceptualized as the region's home for high-tech high-paying jobs that will attract greater investment and increase the area's quality of life. Similar to other areas nationwide, these tech-driven districts aim to capitalize on local strengths - in Riverside, these include higher education, a well-educated local workforce, cultural institutions, historic buildings, and shopping and entertainment. The Innovation District will also provide technical training in green and clean air technology jobs, which are key growing sectors and also complement the California Air Resource Board's cutting-edge research and testing laboratory within the City of Riverside.

Additionally, the District includes the following efforts (including some still in the planning stages):

1. Variety of urban living choices
2. Green mobility network
3. Innovation & entrepreneurship networking

4. Collaborative and creative spaces
5. Information infrastructure
6. Clean Tech and research institutions
7. Cultural food options
8. Cultural inclusion
9. Capital access from private and grant-funded sources
10. Existing community of innovation-led companies

## THE CITY OF ONTARIO - SMART CITY INITIATIVES

Another mechanism for cities to encourage and facilitate more collaboration and innovation is through various "smart city" initiatives. Generally, smart city initiatives refer to utilizing innovative technologies to develop, deploy, and promote sustainable development practices that address growing urbanization challenges. These projects make urban living more efficient and convenient through everything from smart traffic lights and data-driven energy efficiency schemes, to electric vehicle (EV) charging stations and interactive kiosks that offer free broadband.

The City of Ontario has become a leader and innovator in smart city initiatives within the region. For example, OntarioNet was the first municipally-led fiber network in the state of California. Ontario is also utilizing drones to map the city's airspace. They are the first California city to map their skies. Investments in these types of projects helps to not only collaborate with local innovators, but to also mark the region as a place for new technological innovations.<sup>18</sup>

## INDICATORS OF PROGRESS

In order to get a better understanding of the innovation ecosystem in the Inland Empire, we analyzed data from a variety of sources including educational, workforce, job, and industry data.

## DEGREE ATTAINMENT AND RACIAL EQUITY

As discussed in the key concepts and ingredients section of this report, education and the local talent pool are integral parts of the ecosystem. There are two common misconceptions in the Inland Empire on this subject: (1) That the local talent pool is not strong enough to supply the innovation sector meaning that companies looking to locate here would have to look outside the region for employees, and (2) there are not enough innovative sector jobs in the region, leading to those with proper training to look outside the region for employment (the brain drain scenario).

First, to better understand the local talent pool we analyzed the different degrees awarded in the Inland Empire by all local universities, utilizing the Integrated Postsecondary Education Data System or IPEDS. Since 2014, both bachelor and master degrees have been steadily rising as shown in Figure 4. This is in line with the current trend in the U.S. overall (USDE, National Center for Education Statistics, 2020).

Additionally, the data show that universities in the Inland Empire are awarding degrees to women at a higher rate than men. Over time the number of degrees have increased for both men and women, but women have seen an increase of 21.9% since 2014 versus a 17.2% increase for men. Additionally, bachelor's degrees are far more common than master's degrees for both men and women, which also follows the national trend (USDE, National Center for Education Statistics, 2020).].

When analyzing the data by race, the data show that Hispanics in the region are being awarded the most degrees in the Inland Empire. This is not surprising given that the Latinx community is the majority in the region. Interesting, when disaggregating the data by race we see that much of the increasing in degrees since 2014 is being largely driven by Hispanics. Other groups have seen only small increases or have been stagnant over time. Indeed, the number of Black students graduating with four-year degrees in the I.E. has actually decreased slightly since 2014.

In terms of STEM degrees, men actually represent a higher share of STEM BA degrees (54%), than women (46%) as shown in Table 3. An even larger gap emerges when considering Masters degrees, with men accounting for 64% of STEM fields. The IPEDS data also show that Latinx students represent the largest share of STEM majors graduating with a Bachelor's degree (36%), although this proportion drops considerably with respect to the Latinx share of STEM Master's degrees (14%). It is also significantly smaller than the Latinx share of the school-age population in the region (65%). The Asian American share of STEM graduates also drops from bachelor's to master's degrees, with much of the gains made among international students. Finally, Black students only account for 3 percent and 2 percent, respectively, of all STEM graduates, much lower than their share of the school-age population in the region (6.7%).

Aside from analyzing the demographics of who has been graduating, we also looked at the top majors in the region. In terms of the local innovation ecosystem, it is important to understand what degrees students are graduating with and what certifications and skills they would need to enter the innovation workforce. The pie

chart on pg. 11 shows the top 10 majors of graduating students in the Inland Empire from 2014 to 2019. The top major is Business, Management, Marketing and Related Services. Other top majors that are directly tied to the innovation sector include: Health Profession and Related Programs, Biological and Biomedical Sciences, and Engineering.

## WORKFORCE DATA

A diverse and inclusive workforce is necessary to drive innovation, foster creativity, and guide business strategies. Diverse voices and experiences can lead to new ideas, services, and products, and encourage innovative ways of thinking. A study by Forbes (2011) in partnership with industry leaders found that diversity is a key driver of innovation and is a critical component of being successful on a global scale.

Companies are recognizing that a diverse set of experiences, perspectives, and backgrounds is crucial to innovation and the development of new ideas. Additionally, a diverse and inclusive workforce is crucial for companies that want to attract and retain top talent.

According to data from the American Community Survey (2019), the workforce in the Inland Empire is more diverse than the rest of Southern California and the state overall. Both Riverside County and San Bernardino County have a majority minority workforce with Latinos over 50%.

In terms of educational attainment of the workforce, over 50% of workers in the Inland Empire have either some college/associates degree or a BA or higher. This is generally aligned with other regions in Southern California. The Inland Empire has a slightly higher percentage of workers with some college/associates degrees than other regions, but a lower percentage of workers with a BA or higher than the rest of Southern California.

## JOB POSTINGS & CAREER DATA

Next, we analyzed job posting data from Burning Glass Technologies, an analytics software company that provides real-time data on job growth and labor market trends. The data show that job postings from the innovation sector have significantly grown over time, in all the regions we analyzed.<sup>19</sup> Notably, innovation sector job postings have increased significantly more in the Inland Empire than in the rest of Southern California and the state overall. For example, from 2016 to 2020 innovation sector job postings increased by 88.1% in the Inland Empire and 47.9% at the state level. San Bernardino County saw the largest increase with a 101.2% increase in innovation sector job postings since 2016.

From the innovation sector job posting data, we were able to pull out several key skills that were flagged as important for a variety of innovation sector jobs. The table on pg. 3 highlights the most common skills. This is not an exhaustive list, but just a sample of the types of skills employers are currently looking for.

## INNOVATION SECTOR AND CLUSTER ANALYSIS

The following innovation sector and cluster analysis utilizes data from Crunchbase. The analysis was primarily conducted by Blended Impact, our partner on this report. Crunchbase is an online platform that collects information about startups and technology companies, including attributes and relations of companies, people, and investments. Data contained in Crunchbase is, to a large extent, not available elsewhere, making Crunchbase to a unique data source. Crunchbase is rapidly being discovered by scholars from different fields. It has notably already informed studies on specific sectors as well as studies of networks in the start-up ecosystem (Dalle et. al 2017).

In terms of methodology, this analysis used self-reported data from Crunchbase, specifically looking at the Inland Empire regional hub. In total there were 2,524 companies that were analyzed excluding nonprofits and closed companies. While this data is self-reported and does not contain all participants, it does provide a good snapshot of the innovation ecosystem in the Inland Empire. Crunchbase is the leading destination for company insights from early-stage startups to the Fortune 1000, with over 10 million visits per month.

With this in mind, there are some further limitations with this particular dataset that should be noted. Because the data are all self-reported, many data points could likely be further disaggregated to get a clearer picture of important nuances. While this is beyond the scope of this particular report, it is an important area for further study and research.

## INNOVATION CLUSTERS

An innovation cluster is essentially a hot spot where new technologies germinate and where pools of capital, expertise, and talent foster the development of new industries and new ways of doing business. There are several innovation cluster areas in the Inland Empire. The cities of Riverside, Ontario, and Temecula have the largest clusters with 200 plus headquartered companies within their city limits.

When the cluster data is displayed on a map, a clearer picture starts to emerge. The map on pg.13 clearly shows that these clusters are often grouped together. This is the first step in better understanding and mapping the innovation ecosystem in the Inland Empire.

## PROFILE

### COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS (CVAG)

**Representative:** Tom Kirk

**Position:** Executive Director

The Coachella Valley Association of Governments (CVAG) is a regional government association made up of cities, counties, and tribes in the Coachella Valley and has been in existence for over 40 years. With a budget of \$100 million, they operate a robust slate of projects that include air quality, conservation, energy, and transportation programs. Executive Director Tom Kirk highlights that the scope of responsibilities is not dictated by statute, rather, it is dictated by the members themselves.

CVAG's biggest financial responsibility includes a habitat protection system, whereby the association buys open space and conservation land to manage and protect the natural habitats and to facilitate growth and development projects in the Coachella Valley. Another key project includes transportation infrastructure in the Coachella Valley, a set of programs that has been made possible in part by the collaboration between Alliance members in which local communities share transportation data that allow them to build and fund projects. "Folks are very proud of the organization that we've created," says Tom, "There are some differences in views, but the Alliance has worked together and started innovative policy programs."

A strength in their organization has been their collaboration with UC Riverside on their habitat conservation plan and work on understanding changes due to climate change in the region. Opportunities to strengthen innovation in the Coachella Valley region include more incubation programs that focus on small, innovative firms, expanding the reach of broadband in the region, and potentially building a California State University campus which would attract skilled labor that would help fill a need in the Coachella Valley.

According to the Crunchbase data, the top five most popular industries in the Inland Empire innovation ecosystem are: (1) consulting, (2) health care, (3) E-commerce, (4) advertising, and (5) manufacturing<sup>20</sup>. Table 6 below notes the top 20 industries in the region.

The data also shows that cluster sectors vary from city to city. Interestingly, each city has a different top cluster sector. The City of Corona has especially diverse cluster sectors with automotive, information technology, and aerospace industries as a top 3.

In terms of the founding of new companies, the data show that certain areas in the ecosystem have more new companies than others. There are a plethora of reasons that a company may choose a specific region, but often it comes down to infrastructure, regulations, and what other companies and assets are already in the area. The top 10 regions for companies in the Inland Empire that were between 2010 and 2020. The top 3 areas for new businesses are: (1) Riverside, (2) Temecula, and (3) Ontario.

### **ANCHOR ENTITIES & EMPLOYERS**

We also analyzed organizations with very large revenues and who employ a significant amount of people in the region. Due to their influence and impact on the innovation ecosystem, we regard them as anchor entities and employers. The Inland Empire innovation ecosystem contains 5 anchor institutions with revenues between \$1 billion and \$10 billion. With these large revenues, these companies have the resources to significantly impact the local innovation ecosystem.

Beyond revenues, it is also important to understand large employers in the ecosystem that have a significant impact on the workforce.

It is important to note that government entities, nonprofits, and higher education institutions may be anchors in the ecosystem, but are not included in the database.

### **FUNDING & INVESTMENT**

There are many different levels and stages of funding that a company can utilize. Of the data reported through Crunchbase, seed funding is the most common funding stage and type of funding in the Inland Empire.

Seed funding is the first official equity funding stage. It typically represents the first official money that a business venture or enterprise raises. Some companies never extend beyond seed funding into Series A rounds or beyond. This early financial support is ideally the “seed” which will help to grow the business.

Given enough revenue and a successful business strategy, as well as the perseverance and dedication of

investors, the company will grow. Seed funding helps a company to finance its first steps, including things like market research and product development. With seed funding, a company has assistance in determining what its final products will be and who its target demographic is. Seed funding is used to employ a founding team to complete these tasks.

There are many potential investors in a seed funding situation: founders, friends, family, incubators, venture capital companies and more. While seed funding rounds vary significantly in terms of the amount of capital they generate for a new company, it's not uncommon for these rounds to produce anywhere from \$10,000 up to \$2 million for the startup in question. For some startups, a seed funding round is all that the founders feel is necessary in order to successfully get their company off the ground; these companies may never engage in a Series A round of funding. Most companies raising seed funding are valued at somewhere between \$3 million and \$6 million.

In total, companies in the Inland Empire innovation ecosystem raised \$580,663,182 according to self-reported data from Crunchbase. According to that same data, Inland Empire companies raised \$306,998,478 in equity. In this context, equity financing is the process of raising capital through the sale of shares.

Some Inland Empire ecosystem companies also raised equity through crowdfunding, sometimes referred to as alternative capital. Online equity crowdfunding platforms like Angelist, EquityNet, StartEngine, and Wefunder allow entrepreneurs and startups to receive funding from backers in exchange for an equity stake in the company. These platforms are fairly new and innovative in that they are transforming the landscape, making it more accessible and opening up investment opportunities for more diverse group of investors.

Table 4 displays the top investors in the Inland Empire, by the number of investments. Tech Coast Angels is the top investor with 5 investments currently.

### **DIVERSITY**

As noted before, diversity is a really strong driver of innovation. A diverse workforce and team is essential for coming up with new innovative services, products, and processes. Additionally, it is important for diverse voices to be in seats of power and have autonomy and independence. Entrepreneurs from historically disenfranchised communities need to be lifted up and supported so they can create products and services that reflect their communities, and so they can build power and wealth.

Crunchbase Diversity tracking launched in August 2020 and 54 companies updated their profiles to include diversity metrics. In the Inland Empire ecosystem: 6 founders reported Black, Hispanic, or Asian/South-East Asian, 46 companies reported Women Founded, and 9 companies reported being Women Led.

While not all companies report this type of data, it does offer a snapshot in the balance of power in the ecosystem. Getting more entrepreneurs from historically disenfranchised communities into the ecosystem takes intentionally and ultimately starts with education and mentorship.

## PATENTS & TRADEMARKS

Patents and trademarks are another essential part of the innovation ecosystem. These are necessary components when transferring a new innovative idea into the marketplace.

**Patent** - A patent is a title that gives its owner the legal right to exclude others from making, using, or selling an invention for a limited period of years in exchange for publishing an enabling public disclosure of the invention.

**Trademark** - A trademark is a type of intellectual property consisting of a recognizable sign, design, or expression which identifies products or services of a particular source from those of others, although trademarks used to identify services are usually called service marks.

The number of patents and trademarks is a good gauge for how innovative and active the innovation ecosystem is in a region. By location, the Crunchbase data show that the most patents have been granted to companies in Riverside, followed by Corona and Ontario (Table 7). This rank generally aligns with the cluster innovation areas noted earlier in this report.

Similarly, Table 8 displays the top ten Inland Empire companies by the number of registered trademarks. Monster Energy in Corona has the highest with 591 registered trademarks, followed by Microflex (358) in Riverside, and Safariland (180) in Ontario. By location, the data show that companies in Ontario (41) have the highest number of trademarks, followed closely by Temecula (38), and then Riverside (32).

## UNIVERSITIES GRADUATING FOUNDERS & CEOs

Another interesting data point available through the Crunchbase dataset is the connection between entrepreneurs graduating from local universities and the creation of new companies. Of the 5 universities in the Inland Empire, UC Riverside has graduated the founders (52), which have created 67 organizations.

Similarly, Table 18 shows the count of graduates that have the title of CEO (Chief Executive Officer).

## COMMON THEMES FROM INTERVIEWS

To better understand the innovation ecosystem in the region, we conducted in-depth interviews with 14 local stakeholders. The interviewees were diverse from government entities, to corporations, to nonprofits working in innovation. Throughout these conversations some common themes emerged.

Almost all of the participants noted that the innovation ecosystem in the Inland Empire has a lot of great assets already, but needs additional work in terms of advertising and showcasing those assets. This highlights the need for more efforts in telling the story and narrative of the region, especially to outside investors.

Interviewees also filled out a survey about the innovation ecosystem. A majority of the respondents agreed that the innovation ecosystem in the Inland Empire is much stronger today than it was 5 years ago.

A bright spot that many interviewees noted was the existing collaboration in the innovation sector, especially in terms of local government entities. Many local governments have been playing a facilitator role, bringing together different parts of the ecosystem.

While this collaboration is good, some of the participants also said that this collaborative effort needs to be more centralized. In the Inland Empire there are many different organizations working on supporting and facilitating innovation. Increasing the collaboration and partnership between these efforts may benefit the region as a whole.

Some additional themes were the need for increased investment in mentorship programs (especially for disenfranchised communities), building up more physical and virtual infrastructure in the region, and increasing access to capital for funding innovation.<sup>21</sup>

## POLICY OPTIONS

### UPDATING REGIONAL NARRATIVES AND MINDSETS

While not technically a policy lever, it is important to understand the role narrative and cultural mindset can play in setting the tone for attracting infrastructure investment and shaping the direction of economic and workforce development activity. For more than two decades, the Inland Empire has been laboring under the dominant narrative of being a region of “cheap dirt” where developable land is plentiful and highly-skilled labor is scarce (Inland Valley Daily Bulletin 2009, Medina 2012).

This narrative has remained stubborn, even though the region has also had a strong record of environmental

conservation (for example, with the establishment of the Riverside Land Conservancy in 1989) and ongoing efforts in land conservation and sustainable farming (see p. 20). The region also boasts numerous higher education institutions, public and private, that graduate thousands of bachelor's and master's students each year (p. 22) and are engaging in significant research, entrepreneurship, and industry partnership activity (see pp. 10, 16, 18, 21, 23, 27). Our analysis also reveals impressive gains in innovation-sector investments and job openings in the last few years. A more coordinated effort at narrative development among stakeholders and leaders in the innovation ecosystem would go far in changing mindsets, both within and outside the Inland Empire.

## REGULATIONS AND INCENTIVES

Municipalities can play a role in creating zones/areas to support incubation, leverage regulations, and removing regulatory barriers. Some of these include expediting permitting processes (an incentive often used by economic development agencies, particularly when the development in question is complicated from a zoning and permitting perspective), tax incentives, and partnerships with local economic development agencies. Granted, these incentives have had varying degrees of success, with critics often arguing that in reality they do not end up benefiting communities (see e.g., Bartik and Austin, 2019). Bartik and Austin (2019) have suggested that as an alternative to completely abandoning the entire incentive process, incorporating expansion of infrastructure and skills development programs can help promote well-designed and cost-effective local economic growth. As a key consideration, they underscore that it is important to understand that “different policies have different effects over time, and benefit somewhat different people. (p. 47)” As an example, they highlight that a 55-year-old will likely not benefit from most job training programs, but job creation as a result of incentives could help them. In addition, the authors argue that finding key leverage points is a more effective way to reform incentives. An example of such a leverage point could be limiting incentives that are too general and instead ensure that they are targeted to specific areas (e.g., areas with high unemployment or high-tech areas). As an added benefit, money saved from curbing use of untargeted tax incentives could be instead redirected toward increasing and expanding services to small businesses and increasing skills development programs. Finally, the authors point out that many incentive programs are over a potentially unnecessarily long time frame. Because many corporate decisions focus on the short-term, eliminating

incentives that go too far out could change the calculus and eventual outcomes of various decisions.

Spurred by the CARB relocation, there has been a push to establish the region - and specifically Riverside - as a hub of clean technology. Specific examples of ways regulations and incentives can be leveraged include:

1. Implementing/adopting flexible zoning and rezoning to accommodate the green technology industry within the general plan
2. Streamlining permitting and planning processes
3. Utilizing opportunity zone designation
4. Strategically leveraging incentives, exemptions, and rebates through planning and public utilities
5. Establishing partnerships for workforce training and clean technology incubation
6. Utilizing current surplus lands for strategic clean technology clustering

## REGIONAL CONNECTIVITY, CLUSTERS, AND PROMOTION OF INNOVATION DISTRICTS

Clustering is a recognized way to spur and support regional economic development and innovation. The basic idea is that proximity of similar-type industries (including support services) can spur the type of collaboration and networking typically associated with dynamic economies (for a general discussion see e.g., Saxenian, 1991; Sturgeon, 2003; Storper and Venables, 2002; Leamer and Storper, 2001; Delgado, Porter, and Stern, 2014; Scott, 2006). Some of the most well-known domestic examples include Cambridge in Massachusetts, Silicon Valley in Northern California, and the Research Triangle in North Carolina. In these cases, the areas are anchored by major knowledge-production industries and educational institutions, helping to provide a back-and-forth of idea generation, knowledge production and sharing, and workforce development and training. Similarly, the innovation ecosystems in Riverside and San Bernardino Counties are and should continue to be connected with and interdependence fostered between neighboring innovation ecosystems of Los Angeles and Orange counties.

In a similar vein, as highlighted in a 2019 Brookings Institution report, innovation districts are a reconceptualization of how urban mixed-use environments can interact with economic clusters of anchor institutions and start-ups. While there has been criticism that such districts are ‘just a fad’, or are in reality an inequitable imbalance, or are overly focused on economic output, or a range of other issues (see e.g., Wagner, 2019; Baily and Montalbano, 2017; Esmailpoorarabi et al., 2016), the concept does highlight the potential for “places

where a “mash up” of economic strengths, physical assets and amenities, and robust social networks foster an open, collaborative innovation ecosystem. (Wagner, 2019)” Ideally, they work to advance inclusive outcomes, including creating labor market pathways via targeted education and job training. In effect, innovation districts aim to take the idea of clustering (e.g., Delgado et al., 2010; Porter, 1996) and creative cities (e.g., Florida, 2006) and create a new, more innovative - and ideally more inclusive - model.

In particular, an Industry Attraction Strategy and Actions report completed by HR&A in 2017 identified re-connecting externally as a way to sustain momentum. Specifically, the report called out: “directly engaging with existing industry partners”, “formalizing partnerships with regional entities”, and “sharing and developing compelling resources for industry attraction” (HR&A, 2017). All of these actions can help cultivate the regional innovation ecosystem.

## BROADBAND ACCESS

While the conversation around technology infrastructure and access has been increasing in recent years due to the increasing importance of an online presence and access (Qiang et al., 2009), the Covid-19 pandemic has only underscored the importance of broadband coverage - for businesses (Pant and Odame, 2017; Shideler and Badasyan, 2012) as well as for consumers, and for access to educational resources and skills training (Qiang et al., 2009). Increasing broadband internet access has been a topic of concern at all levels of government, and the federal government has specifically identified broadband access as a crucial national infrastructure investment (FCC, n.d.; The White House, March 2021). From a policy standpoint, one major issue is the way broadband access is defined. Basically, coverage calculations are based on data voluntarily provided by internet service providers, and uses the geography of census blocks as opposed to individual street addresses (Wheeler, 2021). Congress passed a law in 2020 requiring the FCC to reform its data collection methods. As a result, the FCC has started several initiatives to seek input and create a more accurate map of broadband coverage, including historically underserved areas such as rural and tribal lands (FCC, 2021a; FCC, 2021b). In general, it would be informative for municipalities to be cognizant of Internet access issues as it could help spur local investments into broadband infrastructure.

Another issue is the regulation of broadband service pricing, and this impact on small businesses. A 2010 study conducted by the Office of Advocacy found that

small business customers paid significantly more than residential consumers for comparable speeds. Due to the increasing importance of broadband access, governments can play a proactive role in both supporting broadband infrastructure efforts, as well as regulating costs.

## SUPPORT AND INVESTMENT IN RESEARCH & DEVELOPMENT

Governments at all levels have a role to play in supporting investment in research and development. At the federal level, expansion of investment programs such as SBIR and STTR programs, and expansion/duplication of federal funding for partnership programs such as NSF NRT can help spur innovation. Providing adequate support such that applicants are both ready and competitive in the process can also help increase interest in these types of opportunities.

At the state and local level, there is an opportunity to increase support for higher education partnerships with industry, and strengthening partnership between two- and four-year institutions. There are also opportunities to provide experiential learning opportunities through partnerships between K-12 and higher education.

Research Parks also can provide unique opportunities for collaboration and pipeline opportunities between higher education and continuing education and industry. A 2013 National Academies report on Innovation Ecosystems identified research parks as a way to bridge differences between university and private company cultures, and as a result can fill some of the gaps that exist between the two types of institutions. It should be noted that while research parks can help leverage investments in education into good jobs and economic productivity (e.g., supporting higher-value initiatives and attracting further investment), they often rely heavily on external funding. However, this could also provide an opportunity for further local-regional collaborations.

## EDUCATION AND CAREER PATHWAYS

Research has shown that continuing education, training, apprenticeship, and career pathways programs can play an active role in increasing wages and providing means to access better jobs. In addition, efforts such as up-skilling and workforce development programs can help address underemployment issues, contributing to overall GDP and increasing the tax base. Specifically, these types of programs and initiatives can help strengthen local pipelines to provide skilled labor to support the innovation economy, as opposed to relying on bringing in talent from outside the region. It can also

## PROFILE MILKEN INSTITUTE

**Representative:** Matt Horton

**Position:** Director

The Milken Institute is a non-profit nonpartisan economic policy think tank divided into various centers and policy focus areas. Matt Horton is the Director for the Center for Regional Economics and California Center. Through this capacity, the Institute examines regional economic growth trends, workforce, infrastructure, housing, and resilience in terms of illustrating the inputs that are driving growth and knowledge-based growth from a sector standpoint.

Additionally, Milken Institute has several programs currently focused more closely on the dynamics shaping the future of work. Of the following include the Best-Performing Cities index which tracks and measures city performance from a knowledge-based economic development measurement. Another is the state technology and science index which, every other year, gauges the investment being done on education and human capital at the state level. Milken is also engaging a series of conversations around the state about the future of work and what that looks like from an equity, digital access, and core competencies standpoint. Topics include developing collaboration partnership between employers and higher education leaders that addresses growing automation with re-skilling and other related talent development initiatives for an incumbent, displaced and prospective workforce. Through this lens, Milken examines how local, regional, and state leaders can leverage investments in infrastructure and talent that support equity while seeking to enhance access to jobs at different levels and sectors..

As Matt mentions, “It’s hard to think about these investments in silos”. The Milken Institute aims to facilitate a broad economic mobility conversation that connects with policy, community stakeholders, and private sector leaders involved in shaping transportation, housing, and workforce development decisions.. Through this work of the Institute, Matt believes that fundamentally, resilient economic growth is a byproduct of these coordinated investments in talent and infrastructure that leaders dedicate overtime. Additionally, by engaging at a local and regional level we can identify and scale bottom-up solutions to reflect diverse community needs.

help decrease brain drain by providing increased opportunities for job growth and development.

Regional education institutions are key components of the workforce development pipeline and related infrastructure. For instance, the Riverside Community College District - made up of Moreno Valley College, Norco College, and Riverside City College - has an established Workforce and Economic Development program that focuses on “advancing workforce competitiveness and regional strategic growth through strategic partnerships and innovative workforce services, providing high quality training and supports to foster individual and organizational success.” Such programs additionally provide technical assistance training and up-skilling training.

Similarly, modeled after MIT’s Lemelson-MIT InventTeams<sup>22</sup>, Chaffey College is one of four California colleges to participate in the Invention and Inclusion Innovation Initiative which aims to challenge students to develop innovations to address solutions, including those that have arisen post-Covid-19 (Chaffey College, 2021). Such innovative educational partnerships help provide students opportunities to research challenges, work to conceptualize solutions, utilize the invention process to develop working prototypes, and learn to commercialize their products in a socially-mindful manner.

In a similar vein, a national example is Portland Community College’s Career Pathways program, an example of a stackable certificate program that provides students pathways to a degree and a job. Program options include apprenticeship and trade tracks, along with administration, trade-specific, and other training in a wide variety of high-growth fields. Apprenticeship-specific programs are also a key way to provide opportunities for up-skilling and re-skilling, often can be complemented with youth options, and can lead to a degree.

Financial education and literacy is an essential component of business success, no matter at what size. Financial literacy can aid a business in: understanding the impact of actions, informing decision-making, addressing team budgeting, improving negotiation, and promoting financial efficiency (Cote, 2020).

With initial foundational support provided by the SCAQMD, UCR, RCCD, RUSD, and RCOE are establishing a partnership that will be launched in 2021 to build comprehensive educational pathways in the sustainability space. The program will be designed with multiple exit points at the high school to PhD level and be hands on, with significant input from industry stakeholder and incorporate traditional curriculum development as well as CTE programs, internships, and other interactive networking opportunities.

## MENTORSHIP & PROMOTION

Mentorship is key for creating a supportive environment, particularly for entrepreneurial women and people of color. It can also help build up leadership from within, that can eventually lead to external positions of influence. These mentorship programs can be housed within educational institutions (e.g., Elliott et al., 2020) or externally (e.g., Brodie et al., 2017). In general, mentorship programs can provide access to a variety of skills and shared experiences (e.g., business knowledge, guidance, access to key networks, etc.) that are often key to small business success and eventually scaling up. They can also help address systemic barriers to entry within the entrepreneurial and innovation ecosystem, but also the business landscape generally.

Additionally, supporting and nurturing regional connectivity can help create an ecosystem that is conducive to innovation, particularly for those who have been traditionally marginalized within these spaces. Regional connectivity can also help leverage alternative/non-traditional sources of capital, such as crowdfunding and revenue-based financing, which may be more accessible ways to support start-up and scaling.

## LEVERAGING FEDERAL INITIATIVES

In February 2021, the Biden-Harris Administration announced the start of a domestic innovation effort, aimed at creating American jobs and addressing the climate crisis. As part of President Biden's commitment to supporting American R&D efforts, the new Climate Innovation Working Group will help coordinate and strengthen federal efforts in fostering cutting-edge, innovative technologies to address net-zero emissions by 2050 and climate-related disaster impacts (e.g., droughts, flooding) (The White House, February 2021). As part of this effort, the US Department of Energy has committed \$100 million in funding via its Advanced Research Projects Agency-Energy (ARPA-E) (Department of Energy, 2021) arm to fund innovative proposals for early-stage research. Because these opportunities are nationally-competitive, both local support (e.g., via training and mentoring from SBDCs or higher education institutions) and political support are key to leveraging R&D talent and capacity, particularly as the Working Group will focus efforts at minority-serving institutions, among others.

## INVESTING IN CLEAN ENERGY

Part of the Biden Administration's push to "Build Back Better" centers around repairing America's infrastructure in both a clean and sustainable manner. This initiative creates a significant opportunity, not only to

create quality jobs, but to rebuild these systems to protect the health of communities, to reduce carbon and other emissions, and to build a stronger, more resilient system.

There are also opportunities that stem from sustainability efforts by utility companies. For example, SoCal Edison released a plan in 2019 to update clean power electrification pathways, entitled Pathway 2045. To get to carbon neutrality by 2045, SoCal Edison is investing in decarbonizing electricity, electrifying transportation, electrifying buildings, utilizing low carbon fuels, and sinking remaining carbon.<sup>23</sup>

More recently, in March 2021, SoCalGas released their ASPIRE 2045 plan which commits to achieve net zero greenhouse gas emissions in their operations and delivery of energy by 2045.<sup>24</sup> This plan is focused around cleaner fuels and related infrastructure. Specifically, SoCalGas is investing in innovative technologies that aim to have a variety of decarbonization solutions for energy transition. This includes, renewable natural gas (biomass waste), fuel cells, hydrogen pipeline infrastructure, carbon capture utilization and sequestration.

## INVESTING IN COMMERCIAL REAL ESTATE

Considering all of the above policy recommendations, it is important to note the importance of early investment in and the involvement of commercial real estate at beginning stages of ecosystem building. While not a policy lever per se, this type of investment is critical to providing a physical home(s) to any anchor initiatives. For instance, clustering, innovation districts, and university/university-related research parks all rely on proximate physical space to cultivate the types of relationships and interactions that make them economic drivers.

## DIRECTORY OF INCUBATORS & ACCELERATORS

The directory below identifies sources and engines of innovation across the Inland Empire. In addition to incubators and accelerators, select academic institutions that do not have incubators have been included due to their potential to deliver innovators with IP and early stage companies.

Organization	Short Description
4th Sector Innovations - Ontario  <a href="https://4thsi.com/ontario/">https://4thsi.com/ontario/</a>	Fourth Sector Innovations' purpose is to bring the power of innovation and entrepreneurship to for-profit, nonprofit and government organizations. Our approach to exploring and realizing meaningful value is built on a comprehensive system architecture, powerful core principles and a robust operations and resource kit for execution. Their mission is to provide a network of safe, engaging and impactful spaces that enhance collective opportunity and advancement through innovation and entrepreneurship.
Bourns Family Youth Innovation Center  <a href="https://www.riversideca.gov/park_rec/facilities-parks/bourns-family-youth-innovation-center">https://www.riversideca.gov/park_rec/facilities-parks/bourns-family-youth-innovation-center</a>	The Youth Innovation Center is the City of Riverside's newest community center. With state of the art equipment and a mission to help propel Riverside into an innovative tomorrow, the center will offer both free and fee based activities with a focus on youth. Their mission is to provide opportunities to visitors by introducing them to professionals and services that will promote and enhance learning to increase the likelihood of life-long success.
Blackstone Launchpad  <a href="https://www.blackstone-launchpad.org/">https://www.blackstone-launchpad.org/</a>	Blackstone LaunchPad powered by Techstars delivers resources, mentorship, and opportunities for entrepreneurial skills training through a network of university campuses. The program, which had expanded to all UC campuses in fall 2019, offers tools and resources for budding entrepreneurs seeking to build their technical startup skills and create new businesses. UCR activities included a speaker series, workshops, networking events, and one-on-one mentoring.
Cal Baptist University (CBU)  <a href="https://calbaptist.edu/programs/bachelor-of-science-entrepreneurship/">https://calbaptist.edu/programs/bachelor-of-science-entrepreneurship/</a>	California Baptist University (CBU) is one of the top private Christian colleges and universities in Southern California. The Bourns College of Engineering is growing rapidly in terms of both students and facilities. In its first year, they have started work on new labs and classroom space and have received numerous gifts and grants including a grant from the National Science Foundation. The University is considering the addition of an incubation program as part of the Engineering College, although it is in the early stages of planning.
California State University - San Bernardino (CSUSB)  <a href="https://entre.csusb.edu/content/MSEI">https://entre.csusb.edu/content/MSEI</a>	CSUSB is a Cal State San Bernardino is listed among the best colleges and universities in the western United States. Many CSUSB programs have earned specialized national and international accreditation, including the business program, which was the first in the Inland Empire to gain AACSB Accreditation at both the graduate and undergraduate levels. The university has an innovation lab and also a new Master of Science in Entrepreneurship & Innovation degree.
California Air Resources Board (CARB)  <a href="https://arb.ca.gov/">https://arb.ca.gov/</a>	Relocating CARB's research facility to the region provides a range of opportunities beyond bringing with it up to 500 high-paying jobs. It also brings with it the potential for strategic companies to relocate to the region, and for the emergence of support companies to deliver value added services to CARB and to strategic companies aligned with CARB.

Organization	Short Description
Cleantech San Diego <a href="https://cleantechsandiego.org/">https://cleantechsandiego.org/</a>	Cleantech San Diego is a member-based trade organization that positions the greater San Diego region as a global leader in the cleantech economy and smart cities movement. As a nonprofit organization, Cleantech San Diego is uniquely positioned to support the cleantech industry by fostering collaborations across the private-public-academic landscape, leading advocacy efforts to promote cleantech priorities, and encouraging investment in the San Diego region. Michael Ford is the Inland Empire Program Manager for Cleantech San Diego. Its members include more than 100 local businesses, universities, governments, and nonprofits committed to advancing sustainable solutions for the benefit of the economy and the environment.
The Creat'R Lab <a href="https://library.ucr.edu/research-support/making-and-innovation/creatr-lab-makerspace">https://library.ucr.edu/research-support/making-and-innovation/creatr-lab-makerspace</a>	The Creat'R Lab is a multi-faceted learning space designed for the UCR community to promote innovation and entrepreneurship. The lab offers workshops, collaborative events, and equipment for personal use including 3D printing, basic hand tools, electronics, and associated software. The Creat'R Lab is located on the first floor of Orbach Library at the UCR campus.
The Palm Springs Innovation Hub (iHub) [CVEP] <a href="https://cvep.com/palm-springs-ihub-and-accelerator-campus/">https://cvep.com/palm-springs-ihub-and-accelerator-campus/</a>	The Palm Springs Innovation Hub (iHub), managed by the Coachella Valley Economic Partnership, is a state-designed business incubator funded by the city of Palm Springs and Wells Fargo. The iHub focuses on early-stage business in the fields of renewable energy, health and medicine, and digital technology. The Palm Springs iHub also offers the Palm Springs Accelerator Campus – designed to mitigate start-up risks and increase the probability of business prospering and growing into the future
EPIC SBDC <a href="https://ociesmallbusiness.org/sbdc-tech/">https://ociesmallbusiness.org/sbdc-tech/</a>	UC Riverside's EPIC SBDC provides individualized mentorship to early stage tech entrepreneurs and companies in the Inland Empire to grow their technology businesses at no cost. Funded by the Small Business Administration, services include specialized consulting, training programs and workshops, access to capital and SBIR/STTR assistance. EPIC SBDC has more than 15 seasoned technology executives who serve as Entrepreneurs in Residence to provide business consulting
ExCITE <a href="https://exciteriverside.org">https://exciteriverside.org</a>	ExCITE is Riverside's startup incubator for high tech, high growth science and technology startups by providing co-working space, networking, workshops, and access to mentors. Located in Downtown Riverside, ExCITE is a partnership between the City, the County, and UCR. This unique partnership brings together campus and community resources to position entrepreneurs for success.
The Highlander Venture Fund <a href="https://techpartnerships.ucr.edu/programs-services/funding-opportunities">https://techpartnerships.ucr.edu/programs-services/funding-opportunities</a>	The UCR Highlander Venture Fund just launched in 2017 and recently provided its first investment in 2020. The HVF is a \$10M venture capital fund that intends to invest in campus and regional startups. The fund directly applies to innovation that correlates with a vertical market such as healthcare, energy, environment, and other areas of expertise at UCR. More information can be found through contacting Scott Brovsky, Director of EPIC SBDC <a href="mailto:scott.brovsky@ucr.edu">scott.brovsky@ucr.edu</a> .
The Inland Empire Tech Bridge - at Norco <a href="https://www.secnav.navy.mil/agility/Pages/tb_inlandempire.aspx">https://www.secnav.navy.mil/agility/Pages/tb_inlandempire.aspx</a>	The Inland Empire Tech Bridge is anchored by the Naval Surface Warfare Center (NSWC) Corona Division and will serve as a regional hub of innovation for the Navy command and local partners in academia, nonprofit and private industries. This synergistic network will seek to find faster, better solutions to warfighter challenges while stimulating local economic growth and development
California State University San Bernardino (CSUSB) – Inland Empire Center for Entrepreneurship (IECE)	The Inland Empire Center for Entrepreneurship (IECE) supports entrepreneurship through innovative programs and educational resources. As one of the largest University-based Centers for Entrepreneurship in the US, the IECE develops and delivers experiential learning and student support programs for student studying entrepreneurship and innovation including: the Global Summer Innovation Program and the Catalyst Startup Accelerator and Venture Fund., and many others.

Organization	Short Description
<p>March JPA</p> <p><a href="https://marchjpa.com/documents/docs_forms/draft_general_plan.pdf">https://marchjpa.com/documents/docs_forms/draft_general_plan.pdf</a></p>	<p>March Air Force Base was converted from an active duty base to a Reserve Base in 1996. The March JPA is planning and implementing new uses for currently vacant lands, reuse of existing facilities, and joint use of the airfield facilities for the development of an air cargo facility. The March JPA is planning and implementing new uses for currently vacant lands, reuse of existing facilities, and joint use of the airfield facilities for the development of an air cargo facility. Overseen by Executive Director Dr. Danielle Kelly, the long-term economic gains in the form of developing a civilian air cargo center, and the growth and development of an employment center to account 38,000 jobs are projected.</p>
<p>Mind and Mill Startup Accelerator</p> <p><a href="https://www.mindandmill.com/accelerator">https://www.mindandmill.com/accelerator</a></p>	<p>Mind &amp; Mill focuses on helping early stage startups. They assist startups by giving them access to the Mind &amp; Mill co-working space, weekly meetings with mentors, funding, and assistance in finding additional funding sources once an MVP is achieved.</p>
<p>Murrieta Genomics Incubator</p> <p><a href="https://www.murrieta-genomics.com">https://www.murrieta-genomics.com</a></p>	<p>Murrieta Genomics offers dedicated bench space to fledgling companies at close to no cost, helping them to define their business model and validate their science, and then invest in the companies that "graduate" the incubator.</p>
<p>Norco College</p> <p><a href="https://www.norcocollege.edu/Pages/Welcome.asp">https://www.norcocollege.edu/Pages/Welcome.asp</a></p>	<p>With a focus on workforce development, Norco College has technical courses, programs, and capabilities. Norco College seeks to attract organizations who need customized certificate programming for employees.</p>
<p>National Science Foundation I-Corps Program</p> <p><a href="https://techpartnerships.ucr.edu/programs-services/entrepreneurship-support-epic/national-science-foundation-i-corps-program">https://techpartnerships.ucr.edu/programs-services/entrepreneurship-support-epic/national-science-foundation-i-corps-program</a></p>	<p>The NSF I-Corps Program is a quarterly program designed to train incoming entrepreneurs and aid in developing their skills for product commercialization. The program provides opportunities for mentorship, business skills, networking, and funding. It is provided by the Entrepreneurial Proof of Concept and Innovation Center (EPIC)</p>
<p>Office of Research and Economic Development at UC Riverside (OASIS)</p> <p><a href="https://techpartnerships.ucr.edu/oasis">https://techpartnerships.ucr.edu/oasis</a></p>	<p>The Office of Technology Partnerships is located at the University Office Building. OASIS provides opportunities to advance sustainability, innovation, and social inclusion. The office ultimately aims to better connect and leverage R&amp;D, workforce development, and community engagement in the following areas: agriculture technology, natural resource management (including the future of the Salton Sea), sustainability, and clean logistics.</p>
<p>The Proof of Concept Grants</p> <p><a href="https://techpartnerships.ucr.edu/programs-services/funding-opportunities#proof_of_concept_funding">https://techpartnerships.ucr.edu/programs-services/funding-opportunities#proof_of_concept_funding</a></p>	<p>For faculty with innovative technology that have commercial/business potential, the Proof of Concept Grants can provide up to \$50,000. This is funded by the UCR Research and Economic Development Office and distributed annually to 5-8 faculty. The grant invests in prototyping and translational experiments to bring the product closer to commercialization. More information can be found by contacting Brian Suh <a href="mailto:brian.suh@ucr.edu">brian.suh@ucr.edu</a></p>

Organization	Short Description
<p>The Innovation Lab - City of Riverside</p> <p><a href="https://www.riversideca.gov/it/innovation-lab">https://www.riversideca.gov/it/innovation-lab</a></p>	<p>The goal of the Innovation Lab is to eliminate barriers for innovation and create a unique space and atmosphere for employees in which risk taking is encouraged, and everything is geared towards spurring creativity and nurturing new ideas. The Innovation Lab, staffed with subject matter experts, will provide support in developing and testing employees ideas that are presented to the Innovation Lab team.</p>
<p>The Inland SoCal Link iHub - Riverside County</p> <p><a href="https://static.business.ca.gov/wp-content/uploads/2019/09/2019-iHub-Net-work.pdf">https://static.business.ca.gov/wp-content/uploads/2019/09/2019-iHub-Net-work.pdf</a></p>	<p>California is home to the largest innovation network in the country, with 15 designated Innovation Hubs (iHubs) stretching from San Diego to Redding and covering some of California's most vibrant economic sectors. The state-designated iHubs stimulate partnerships, economic development, and job creation around specific research clusters. The iHubs leverage assets such as research parks, technology incubators, universities, and federal laboratories to provide an innovation platform for startup companies, economic development organizations, business groups, and venture capitalists.</p>
<p>The Randall Lewis Center for Entrepreneurship, Innovation, and Social Impact - University of La Verne</p>	<p>The center will provide entrepreneurial training for several learning cohorts each year and integrate academic and hands-on approaches to job creation and long-term career support, with a special emphasis on underserved communities in the region. This center will be launching soon; more information at <a href="https://lasentinel.net/university-of-la-verne-to-open-entrepreneurship-center.html">https://lasentinel.net/university-of-la-verne-to-open-entrepreneurship-center.html</a>.</p>
<p>SBIR/STTR Resource Center</p> <p><a href="https://sbir.ucr.edu/">https://sbir.ucr.edu/</a></p>	<p>SBIR/STTR Resource Center, developed in partnership by EPIC SBDC and The Office of Technology Partnerships, provides UCR faculty and regional small businesses with support towards innovative research proposals and building partnerships. The resource center offers a network of learners and experts, in depth reviews for business proposals and mentorship towards producing viable commercialization plans.</p>
<p>Southern California Energy Innovation Network by i6 - Cleantech San Diego</p> <p><a href="https://cleantechsandiego.org/scein/">https://cleantechsandiego.org/scein/</a></p>	<p>Through the i6 Regional Innovation Strategies grant, Cleantech San Diego received \$1.5 million to scale up the capacity of the Southern California Regional Energy Innovation Network (SCEIN) program and support clean energy startups located in Riverside and San Bernardino counties. The University of California, Riverside, is supporting the program with in-kind matching, office space and logistical support for the Inland Empire</p>
<p>The Life Science Incubator - UCR</p> <p><a href="https://news.ucr.edu/media/image/wetlab-incubator-opening">https://news.ucr.edu/media/image/wetlab-incubator-opening</a></p>	<p>UCR's Life Science Incubator is the first of its kind in the region. It is available for local residents and companies looking to foster new developments in the life sciences, agriculture, biotech and medical technology fields.</p> <p>In addition to using the lab's workspaces and its state-of-the-art equipment, tenants will have access to other scientific facilities on the campus and can interact with faculty members. Mentoring and access to capital for these efforts come from the UC Riverside Entrepreneurial Proof of Concept and Innovation Center Small Business Development Center. The lab was funded by federal and state grants, as well as from internal funds from the university.</p>

## REFERENCES

- Alston, Ken, Mikela Waldman, Julie Blunden, Rebecca Lee, and Alina Epriman. Building Lithium Valley: Opportunities and Challenges Ahead for Developing California's Battery Manufacturing Ecosystem." *New Energy Nexus* (2020).
- Bharath, Deepa. "\$5 million Coming for Black-led Organizations in the Inland Empire with New Initiative." *Press Enterprise* (2020) July 14.
- Bluffstone, Randall A., and Brad Ouderkirk. "Warehouses, trucks, and PM2. 5: Human health and logistics industry growth in the eastern Inland Empire." *Contemporary Economic Policy* 25, no. 1 (2007): 79-91.
- Brodie J, Van Saane SH, Osowska R. Help wanted: Exploring the value of entrepreneurial mentoring at start-up. *Industry and Higher Education*. 2017;31(2):122-131. doi:10.1177/0950422217691666
- Cai, Yuzhuo, and Cui Liu. "The role of university as institutional entrepreneur in a regional innovation system: Towards an analytical framework." *Examining the Role of Entrepreneurial Universities in Regional Development*. IGI Global, 2020. 133-155.
- Cote, Catherine. "The Importance of Financial Literacy in Business." *Harvard Business School Online*. May 2020. URL: <https://online.hbs.edu/blog/post/importance-of-financial-literacy>
- Baily, Martin N., and Nicholas Montalbano. "Clusters and Innovation Districts: Lessons from the United States Experience." *The Brookings Institution*. January 2018. URL: [https://www.brookings.edu/wp-content/uploads/2018/01/es\\_20180116\\_bailyclustersandinnovation.pdf](https://www.brookings.edu/wp-content/uploads/2018/01/es_20180116_bailyclustersandinnovation.pdf)
- Bartik, Timothy J., and John Austin. "Most business incentives don't work. Here's how to fix them." *Brookings Institution: The Avenue*. November 2019. URL: <https://www.brookings.edu/blog/the-avenue/2019/11/01/most-business-incentives-dont-work-heres-how-to-fix-them/>
- Bonacich, Edna. "Working with the labor movement: A personal journey in organic public sociology." *The American Sociologist* 36.3-4 (2005): 105-120.
- Chaffey College. "Chaffey College Joins State Innovation Initiative." March 2021. URL: <https://www.chaffey.edu/news/news/chaffey-joins-state-innovation-initiative.php>
- Dalle, Jean-Michel, Matthijs Den Besten, and Carlo Menon. "Using Crunchbase for economic and managerial research." (2017).
- Delgado, Mercedes, Michael E. Porter, Scott Stern, Clusters and entrepreneurship, *Journal of Economic Geography*, Volume 10, Issue 4, July 2010, Pages 495-518, <https://doi.org/10.1093/jeg/lbq010>
- Department of Energy. DOE Announces \$100 Million for Transformative Clean Energy Solutions. February 2021. URL: <https://www.energy.gov/articles/doe-announces-100-million-transformative-clean-energy-solutions>
- Elliott, C., Mavriplis, C. & Anis, H. An entrepreneurship education and peer mentoring program for women in STEM: mentors' experiences and perceptions of entrepreneurial self-efficacy and intent. *Int Entrep Manag J* 16, 43-67 (2020). <https://doi.org/10.1007/s11365-019-00624-2>
- Emerson, Sandra. "San Bernardino-to-Redlands Rail Project Raises Funding Questions." *The Sun* (2015) February 25.
- Esmailpoorarabi, Niusha, Yigitcanlar, Tan, & Guaralda, Mirko(2016) Place quality and urban competitiveness symbiosis? A position paper. *International Journal of Knowledge-Based Development*, 7(1), pp. 4-21. URL: <https://eprints.qut.edu.au/94245/3/94245.pdf>
- Federal Communications Commission. Bridging the Digital Divide for All Americans. URL: <https://www.fcc.gov/about-fcc/fcc-initiatives/bridging-digital-divide-all-americans>
- Federal Communications Commission. Broadband Data Collection. April 2021a. <https://www.fcc.gov/BroadbandData>
- Federal Communications Commission. Broadband Data Collection Consumer Information. April 2021b. <https://www.fcc.gov/BroadbandData/consumers>
- Folmer, James. "A New Entrance to Central Redlands is Taking Shape." *Redlands Community News* (2020), September 24.
- Florida, Richard. "The Flight of the Creative Class. The New Global Competition for Talent." *Liberal Education Featured Topic*. (2006): 22-29. URL: <https://files.eric.ed.gov/fulltext/EJ743282.pdf>
- Gault, Fred. "Defining and measuring innovation in all sectors of the economy." *Research Policy* 47.3 (2018): 617-622.
- Gobble, MaryAnne M. "Charting the innovation ecosystem." *Research-Technology Management* 57.4 (2014): 55-59.
- HR&A. "Industry Attraction Strategy and Actions." Commissioned by the University of California Riverside. December 2017.
- Insights, Forbes. "Global diversity and inclusion: Fostering innovation through a diverse workforce." *Forbes Insight*, New York (2011).
- Isabelle, Diane. "Key factors affecting a technology entrepreneur's choice of incubator or accelerator." *Technology innovation management review* (2013): 16-22.
- Jackson, Deborah J. "What is an innovation ecosystem." *National Science Foundation* 1.2 (2011): 1-13.
- Krug, Kris. "2013 Esri International User Conference - San Diego, CA" (2013) Licensed with CC BY-NC-ND 2.0.
- Leamer, Edward E. and Michael Storper. *The Economic Geography of the Internet Age*. National Bureau of Economic Research, Working Paper 8450. August 2001. <http://www.nber.org/papers/w8450>
- Ma, Lei, et al. "The impact of local government policy on innovation ecosystem in knowledge resource scarce region: Case study of Changzhou, China." *Science, Technology and Society* 24.1 (2019): 29-52.
- Mason, Colin, and Ross Brown. "Entrepreneurial ecosystems and growth oriented entrepreneurship." *Final report to OECD, Paris* 30.1 (2014): 77-102.
- Mass Transit. "SBCTA Board to Begin Negotiating with The Boring Company on the Ontario Loop Project." (2021) Feb. 4.
- Meyer, Natanya, and Jacques de Jongh. "The importance of entrepreneurship as a contributing factor to economic growth and development: The case of selected European countries." *Journal of Economics and Behavioral Studies* 10.4 (J) (2018): 287-299.
- Moore, James F. "Predators and prey: a new ecology of competition." *Harvard business review* 71.3 (1993): 75-86.
- Nambisan, Satish, and Robert A. Baron. "Entrepreneurship in innovation ecosystems: Entrepreneurs' self-regulatory processes and their implications for new venture success." *Entrepreneurship theory and practice* 37.5 (2013): 1071-1097.
- National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. 2013. *Trends in the Innovation Ecosystem: Can Past Successes Help Inform Future Strategies? Summary of Two Workshops*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/18509>.
- Pant, Laxmi Prasad, and Helen Hambly Odame. Broadband for a sustainable digital future of rural communities: A reflexive interactive assessment, *Journal of Rural Studies*, Volume 54, (2017): 435-450, <https://doi.org/10.1016/j.jrurstud.2016.09.003>.
- Porter ME. *Competitive Advantage, Agglomeration Economies, and Regional Policy*. *International Regional Science Review*. 1996;19(1-2):85-90. doi:10.1177/016001769601900208
- Qiang, Christine Zhen-Wei, Rossotto, Carlo M., and Kaoru Kimura. "Economic impacts of broadband." In *Extending Reach and Increasing Impact*. The World Bank. (2009): 35-50. URL: <https://openknowledge.worldbank.org/bitstream/handle/10986/2636/487910PUB0EP111010fficial0Use00Only1.pdf?sequence=1&#page=57>
- Sant, Tomás Dias, et al. "The structure of an innovation ecosystem: foundations for future research." *Management Decision* (2020).
- Sapien, Josphine Cordero. "SBCTA Board Explores Privately Funded High-Speed Rail." *Railway News* (2020) Jul. 8.
- Saxenian, AnnaLee. The origins and dynamics of production networks in Silicon valley. *Research Policy*. 20 (1991). 423-437.
- Scott, Allen J. *Entrepreneurship, Innovation and Industrial Development: Geography and the Creative Field Revisited*. *Small Business Economics*, Feb., 2006, Vol. 26, No. 1 (Feb., 2006), pp. 1-24

- Shideler, D. and Badasyan, N. (2012), "Broadband impact on small business growth in Kentucky", *Journal of Small Business and Enterprise Development*, Vol. 19 No. 4, pp. 589-606. <https://doi.org/10.1108/14626001211277415>
- Smith, Kevin. "Amazon looking to hire 4,900 in the Inland Empire." *Press-Enterprise* (Sept. 14, 2020).
- Stam, Erik. "Entrepreneurial ecosystems and regional policy: a sympathetic critique." *European Planning Studies* 23.9 (2015): 1759-1769.
- Storper, Michael and Anthony J. Venables. *Buzz: The economic force of the city*. Paper presented at the DRIUD Summer Conference on "Industrial Dynamics of the New and Old Economy - who is embracing whom?" Copenhagen/Elsinore 6-8 June 2002.
- Sturgeon, Timothy J. What really goes on in Silicon Valley? Spatial clustering and dispersal in modular production networks. *Journal of Economic Geography*. 3 (2003), p. 199-225
- Sun, Sunny Li, et al. "Enriching innovation ecosystems: The role of government in a university science park." *Global Transitions* 1 (2019): 104-119.
- The White House. Fact Sheet: The American Jobs Plan. March 2021. URL: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>
- The White House. Biden-Harris Administration Launches American Innovation Effort to Create Jobs and Tackle the Climate Crisis. February 2021. URL: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/02/11/biden-harris-administration-launches-american-innovation-effort-to-create-jobs-and-tackle-the-climate-crisis/>
- Tremblay, Diane-Gabrielle, and Thomas Pilati. "Social innovation through arts and creativity." *The international handbook on social innovation: Collective action, social learning and transdisciplinary research* (2013): 67-79.
- Wagner, Julie. "Innovation districts and their dilemma with place." *Brookings Institution: The Avenue*. November, 2019. URL: <https://www.brookings.edu/blog/the-avenue/2019/02/21/innovation-districts-and-their-dilemmas-with-place/>
- Wagner, Julie. "New insights on how innovation districts are challenging economic and social divides." *The Brookings Institution: The Avenue*. July 2019. URL: <https://www.brookings.edu/blog/the-avenue/2019/07/19/new-insights-on-how-innovation-districts-are-challenging-economic-and-social-divides/>
- Wheeler, Tom. "Connecting the unconnected in rural America: Part 2 of Build Back Better with the Biden FCC." *The Brookings Institution: TechTank*. February 2021. URL: <https://www.brookings.edu/blog/techtank/2021/02/11/connecting-the-unconnected-in-rural-america/>
- 6 Air Quality - Cities and Counties, Environmental Protection Agency. <https://www.epa.gov/air-trends/air-quality-cities-and-counties>. Retrieved April 21, 2021.
- 7 CalMatters.2021. <https://calmatters.org/environment/2021/02/california-desert-lithium-valley/>
- 8 New Energy Nexus. 2020. <https://www.newenergynexus.com/news/new-report-the-ev-revolution-needs-lithium-california-has-it/>
- 9 For more information: <https://www.federalregister.gov/documents/2018/05/18/2018-10667/final-list-of-critical-minerals-2018>
- 10 Additional information: <https://about.bnef.com/electric-vehicle-outlook/>
- 11 CalMatters.2021. <https://calmatters.org/environment/2021/02/california-desert-lithium-valley/>
- 12 Fontana Herald News: [https://www.fontanaheraldnews.com/news/inland\\_empire\\_news/cal-state-san-bernardino-gets-10-5-million-grant-and-a-prestigious-national-designation/article\\_e033905a-0a7d-11eb-a626-c31de5a625a5.html](https://www.fontanaheraldnews.com/news/inland_empire_news/cal-state-san-bernardino-gets-10-5-million-grant-and-a-prestigious-national-designation/article_e033905a-0a7d-11eb-a626-c31de5a625a5.html)
- 13 *InlandEmpire.us*. 2018.<https://inlandempire.us/csusb-receives-749k-nsf-grant-for-cyber-pilot-program/>
- 14 Riverside County. 2020. <https://www.rivcoeh.org/OurServices/Foods/MicroenterpriseHomeKitchenOperations>
- 15 These examples are derived from the State of Education Equity in the Inland Empire, State of Civic Engagement in the Inland Empire, and State of Nonprofits in the Inland Empire. Available <https://socialinnovation.ucr.edu/state-inland-empire-series>
- 16 CA Workforce Development Board. 2020.<https://cwdb.ca.gov/wp-content/uploads/sites/43/2020/09/AB-398-Report-Putting-California-on-the-High-Road-ADA-Final.pdf>
- 17 CARB. 2019. <https://ww2.arb.ca.gov/news/carb-riverside-educational-institutions-sign-agreements-train-future-environmental-leaders>
- 18 For additional information and an expanded list of initiatives, CSI-UCR has worked with community partners to create a map of initiatives that advance inclusion, sustainability, and equity. This is a comprehensive, regularly updated list of collective initiatives in the region that advance core values of resilience, inclusion, sustainability, and equity in the region. As a collaborative effort, it is meant to be updated frequently with new projects and initiatives. <https://socialinnovation.ucr.edu/inland-empire-initiative-map>
- 19 The occupational codes that were defined as the innovation sector include: Management Occupations, Business and Financial Operations Occupations Computer and Mathematical Occupations, Architecture and Engineering Occupations, Life, Physical, and Social Science Occupations, Educational Instruction and Library Occupations, Arts, Design, Entertainment, Sports, and Media Occupations, Healthcare Practitioners and Technical Occupations, Protective Service Occupations, Sales and Related Occupations, Construction and Extraction Occupations, Installation, Maintenance, and Repair Occupations, Production Occupations, Transportation and Material Moving Occupations, and Military Specific Occupations.
- 20 Emerging industries such as clean tech or agritech do not yet have their own industry categories and companies may have elected broader categories not reflected in the data yet
- 21 The full interview profiles will be available at our website: <https://socialinnovation.ucr.edu/research>
- 22 MIT.2021.<https://lemelson.mit.edu/inventteams>
- 23 SoCal Edison.2019. <https://www.edison.com/home/our-perspective/pathway-2045.htm>
- 24 SoCalGas. 2021. [https://www.socalgas.com/sites/default/files/2021-03/SoCalGas\\_Climate\\_Commitment.pdf](https://www.socalgas.com/sites/default/files/2021-03/SoCalGas_Climate_Commitment.pdf)
- 25 SoCal Edison.2019. <https://www.edison.com/home/our-perspective/pathway-2045.htm>
- 26 Stanford News.2021. <https://energy.stanford.edu/news/bill-gates-climate-challenge-formidable-solvable>

## ENDNOTES

- 1 Alliance SoCal.2011: <https://www.alliancesocal.org/community/local-innovation-communities>
- 2 While there have been long standing debates about the actual performance of streetcars in promoting economic development, working toward a development that is uniquely responsive to local needs, desires, and available assets/resources can potentially help address known issues that have surfaced with other similar projects, and establish a more balanced cost/benefit ratio.
- 3 UCR CNAS.2020.<https://cnas.ucr.edu/media/2020/09/21/uc-river-side-wins-grant-bring-artificial-intelligence-colorado-river-basin>
- 4 UCR News.2021. <https://news.ucr.edu/articles/2021/03/17/new-school-medicine-education-building-receives-full-approval-uc-regents>
- 5 Loma Linda Press Release.2009.<https://news.llu.edu/research/loma-linda-university-health-partnership-with-meddevco-llc-produces-first-medical-device-company-darrrt-llc-offering-first-product-industry-innovative-medical-device>



*The Center for Social Innovation provides a credible research voice that spurs civic leadership and policy innovation. Its reputation is built on the key pillars of social science, strategic policy awareness, innovation mindsets, and deep community partnerships. CSI integrates researchers, community organizations, and civic stakeholders in collaborative projects and long-term partnerships that strengthen shared values of resilience, inclusion, sustainability, and equity (RISE). Importantly, the Center seeks to shift away from a “problem” narrative to an “opportunity” narrative for marginalized communities and localities.*

## ACKNOWLEDGMENTS

This report was co-authored by various faculty, researchers, and students at the University of California, Riverside, with valuable assistance from partners in community organizations and public agencies. In addition to those leaders featured in this report, we also benefited from the expertise and perspectives of Scott Brovsky, Rosibel Ochoa, David Pearson, and Caleb Ragan.

Special thanks to Safi Bajwa, Stacy Cumberbatch, Kateylnn Grajeda, Sarah Hayes, Evelyn Pruneda, Sydney Pun, Karthick Ramakrishnan, Gary Rettberg, Beth Tamayose, and Quanfeng Zhou. We alone remain responsible for the analysis and claims made in this report.

Our Center is grateful for the generous support of the Bill & Melinda Gates Foundation, California Wellness Foundation, James Irvine Foundation, Robert Wood Johnson Foundation, and Weingart Foundation for making reports like these possible.

## IN PARTNERSHIP WITH

# B L E N D E D I M P A C T

*Blended Impact is a venture development firm and innovation lab based in Riverside, CA. We focus on investments at the intersection of venture capital and economic development, across both high growth companies and real estate.*

*We form public-private partnerships to launch innovative programs and investment strategies focusing on alternative capital to advance the way we invest, live, and earn.*

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