

UNLV & Community Stakeholders Technology Commercialization Project

Six-Month Progress Report

Reporting Period: March 1, 2022 – August 31, 2022

Report Date: October 3, 2022

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Project Purpose

The UNLV & Community Stakeholder Commercialization Project is focused on the development and successful commercialization of inventions developed by UNLV faculty and staff with a specific goal of increasing both the total number of inventions licensed and the number of business startups established. This effort supports GOED's mission to "conduct research and create intellectual property that will be used to develop new, relevant technologies to help companies grow their R&D base and enhance their growth through innovation." The project established the following initiatives:

1. Standardized community assessment for de-risking technologies
2. Engaging community subject matter experts through Entrepreneur-In-Residence (EIR)/ Executive-In-Residence (XIR) modeled efforts
3. Translational grant funding and commercialization validation

Standardized Community Assessment for De-Risking Technologies

The primary purpose of this initiative is to implement new programs that are organized around and involve qualified community groups, service providers, subject matter experts, serial entrepreneurs, and individuals engaged by UNLV's Office of Economic Development ("OED"), to assist with the identification, assessment and ultimately the successful commercialization of UNLV inventions. In short, the primary function of these groups is to "de-risk" the inventions and provide development and commercialization guidance and mentorship. The success of this initiative will be measured through an increase in technologies licensed and startup companies formed. This initiative is expected to last, at minimum, through later-2022. These community groups and individuals will serve as mentors and resources for both UNLV inventors as well as to startup companies based on UNLV inventions.

The OED is now actively engaging individuals and community groups and other Nevada-based organizations specializing in entrepreneurial and startup support to help with this initiative and serve as part of a "De-Risking Team." One of those engaged groups, Entrepreneurs Assembly (EA), is a Nevada-based organization that has an extensive network of business owners and subject-matter experts on their roster and is now providing support to successfully de-risk and commercialize UNLV inventions. Additional community groups with appropriate expertise and capabilities may be added. EA will assist the OED by engaging with UNLV faculty inventors and Licensing and Business Development team at OED to identify and assess innovations, as may be protected by intellectual property rights, for commercial viability.

De-Risking Goals

This community-based invention de-risking will rely on EA and other various De-Risking Team members, working in conjunction with UNLV and its designees, to identify and advance priority UNLV inventions. The goal for this initiative is to create one startup or spinout business per year, and the completion of two licensing agreements per year, for the two-year trial period, or in lieu of one of these goals, obtain additional funding to further develop inventions to the point they are suitable for spinout or licensing agreements.

By utilizing expertise and experience from EA and OED's Technology Assessment Committee (TAC), OED is proactively engaging with community members to increase the likelihood of successfully commercialized inventions. Additional details regarding TAC and EA follow below.

Technology Assessment Committee (TAC)

The OED Technology Assessment Committee (the "TAC") is comprised of subject-matter experts, entrepreneurs, mentors, venture capitalists, leaders in the business community, and government representatives who assess and champion UNLV based inventions toward commercial success. TAC and OED work in partnership to advance protectable inventions and intellectual property with significant commercial potential through developing and applying start-up, licensing, and business development strategies. This TAC initiative will help unify the economic development sectors through a document-driven assessment and commercialization process.

Members of TAC provide important technical, product development, intellectual property and market information allowing OED and the business community to make more informed, data-driven decisions whether to expend resources protecting and commercializing promising inventions. With the advent of the new Harry Reid Research and Technology Park, TAC will have a greater platform than ever before to engage with forerunners of innovation in key industries within the Las Vegas valley and beyond.

It should be noted that given the demands of COVID-19, in-person TAC meetings remain suspended, and none were held during the current reporting period. Notwithstanding, TAC members continued to assist with de-risking technologies through a less formal engagement using primarily email and Zoom meeting approaches.

Entrepreneurs Assembly (EA)

Entrepreneurs Assembly (EA), a Nevada non-profit organization, serves as a global community for the entrepreneur. EA is dedicated to mentoring and advising entrepreneurs in creating and growing their businesses. By creating local collaborative communities of entrepreneurs and mentors, they continue to promote economies around the world. Over the last 9 years, EA has mentored and advised over 1,000 entrepreneurs, startups and small businesses – with the belief that entrepreneurial small businesses are the future of the global economy.

Entrepreneur-In-Residence (EIR) / Executive-In-Residence (XIR)

An EIR/XIR is a proven business expert that serves as a mentor and guide to members of the UNLV community. EIRs/XIRs are intended to provide insightful and actionable guidance and mentoring to increase the likelihood of success of UNLV inventions and startup ventures, while also fostering engagement between UNLV and the local entrepreneurial community to accelerate the commercialization of UNLV inventions. Beyond their subject-matter expertise and experience, EIRs/XIRs bring a desire to see potential entrepreneurs succeed and have proven to be a valuable asset in advancing university-based innovations toward the commercial marketplace.

EIRs/XIRs represent a wide array of entrepreneurial experience levels from founders to chief executives. They also bring a wealth of skills and a deep network of contacts in disciplines as diverse as finance, operations, human resources, marketing, and law. EIRs/XIRs and UNLV will

synergistically move technologies along the commercialization path and provide distinct resources in assessing technologies, mentoring entrepreneurial teams, locating funding sources, and securing physical locations.

EIR/XIR Goals

Concurrent with serving as a guide and mentor within the UNLV entrepreneurial community, each EIR/XIR is expected to identify a UNLV invention and create and lead a new startup venture that will license and commercialize that invention. Alternatively, they will identify and join a startup venture that is based on an already licensed UNLV invention. EIRs/XIRs are required to contribute their time, knowledge, skill set, subject matter expertise, etc. in a manner commensurate with the funding allocated to the specific project.

EA is comprised of a vast network of entrepreneurs, venture capitalists, angel investors, current and former C-level executives, subject-matter experts, and leaders within the business community. EA has identified several key members within their group to serve as EIRs/XIRs for this project collaboration with OED. See additional information regarding the EA team in Appendix A.

The ability to appoint EIR/XIRs has been impacted by restrictions related to COVID-19. As such, the EIR/XIRs program was largely scaled back during the reporting period and EIR/XIRs served as mentors and advisors through less formal engagements. Notwithstanding the foregoing, Mr. Rahul Harkawat of Entrepreneurs Assembly has served as the primary EIR/XIR for the purposes of this project.

Translational Grant Fund and Commercialization Validation

The Translational Grant Fund and commercialization validation initiative provides translational or “gap” funds to researchers and teams that are working on innovations that have high-potential for commercialization success. Such projects/innovations receiving funds under this program are reviewed and recommended by the De-Risking Teams.

During 2021, an open competitive RFP process was conducted to identify the most promising UNLV early-stage innovations that, with some translational funding, would quickly advance toward a status of “license ready” or “startup ready. Funds were prescribed for either technical development or could be used to support market research and market development, and to best understand the uniqueness/novelty of the invention in relation to its ability to fill market needs or solve an important problem.

Translational Grant Fund Goals

When administering the Translational Grant Fund and associated RFP, two notable requirements for receiving this funding include (i) the applicant must have an invention that has been previously disclosed to OED that is “active”, and, (ii) the applicant must provide a commercial justification for the funds in addition to a technical or scientific justification.

In total, during calendar year 2021, the OED received 17 proposals requesting Translational Grant Fund funding. Each proposal was reviewed and ranked by a UNLV internal committee composed of technical, commercial and business subject matter experts as well as representatives from the Office of the Vice President for Research. In addition, external reviewers also ranked and

provided feedback on the submissions. External reviewers included EA, TAC, EIR/XIRs and subject matter experts.

The seventeen (17) applications that were received were then evaluated by a panel regarding criteria of:

1. **De-Risking** - does the project sufficiently de-risk the technology enough to get it to the next development level and make it commercially viable?
2. **Commercial Viability** - how likely is the technology to become a commercially viable product or service?
3. **Market Size** - how large is the market, industry, and demand (current and future) for the technology?
4. **Patentability** - how likely is it that the technology's intellectual property can be secured by a patent (useful, novel, and non-obvious)?

Results for internal and external reviews were aggregated with scoring and recommendations provided to the interim Vice President for Economic Development. Based on recommendations from the reviewers, and with approval of the interim Vice President for Economic Development, a total of 6 awards were granted to UNLV researchers. Basic information on all proposals received are as follows:

	Researchers	Proposal Title	Award Amount*
1	Jun Kang	Cancer Treatment	\$27,734
2	Jeremy Cho	Atmospheric Water Harvesting	\$27,734
3	Ernesto Abel-Santos	Anti-Diarrheal	\$27,734
4	Brian Hedlund	DNA Sequencing	\$27,734
5	Zhiyong Wang	Disinfecting Air Containing Viruses	\$54,349
6	Pradip Bhowmik	Fire Retardant Polymer	\$27,000
7	Michael Pravica	Reflective Light Device	NF
8	Bob Schill	EM Dots	NF
9	Jay Park	Sensor Vest	NF
10	Jaeyun Moon	Gamma Ray Detector	NF
11	Hui Zhang	Cancer Treatment	NF
12	Yen-Soon Kim Mingon Kang	Food Safety App	NF
13	Samir Moujaes	Automated Whiteboard Er	NF
14	Brendan O'Toole Maria Ramos	Knee Implant Testing Machine	NF
15	Kwang Kim	Flow Sensor	NF
16	Yoohwan Kim	SCADA Cybersecurity	NF
17	Shubhra Bansal	Solar Cells	NF

*Actual project spend may be different than Award Amount.

Information and funded outcomes of each funded project are detailed in Exhibit "A" of this report.

Project Progress

During the reporting term, UNLV has made significant progress toward meeting its proposed goals for this project. Major accomplishments for the current reporting period are outlined below:

Major Projects under Current Review:

Fire-Retardant Polymer

A license agreement between UNLV and NoFire Zone Inc. (dba Firesafe Zone) completed during December 2020 providing the licensee with exclusive worldwide rights to certain intellectual property developed by Dr. Pradip Bhowmik. The licensed technology covers a series of fire-retardant polymers with multiple potential applications. UNLV will receive certain payments under the license including a royalty on sales of the products that are covered under the licensed patents.

Current Firesafe Zone efforts are focused on the development of specific applications and uses of the fire-retardant polymer technology with a primary focus on textiles, construction materials, electronics and high-tech devices, and battery materials.

Current Reporting Period Highlights: Firesafe Zone, Inc. created 2 founder positions and 2 executive positions and has a full-time Director of Research. The company has been an active participant in seeking an NSF Innovation Engine grant as the only Nevada start-up to play a leading role in preparing the grant application. The company has revised its previous non-funded NSF-SBIR grant will resubmit in the last calendar quarter of 2022. During the reporting period the company received approximately \$200,000 in external angel investment and is actively seeking up to \$4.5million for its next funding series.

During the reporting period Firesafe Zone made significant progress toward building research and development partnerships with universities and companies globally. Some of these partnerships including IIT Madras, a leading Indian university with extensive capabilities and expertise in the fire-retardant polymer space, and the State of Wallonia Belgium where significant battery and polymer chemistry expertise reside. In addition, the company has made progress is partnering to obtain development and manufacturing capabilities necessary to further its research and development programs as well as commercial manufacturing of target products.

Additional highlights include FireSafe Zone creating a new subsidiary, Quantum Copper, Inc., that will utilize the fire-retardant polymer technology into new battery systems with a focus on improving non-active battery materials. The company has filed several patents related to this application and is working closely with UNLV researcher Dr. Bhowmik which should yield more innovations and/or intellectual property being developed at UNLV.

Lastly, it should be noted that during the reporting period FireSafe Zone, entered into a lease for office space located at the UNLV Harry Reid Research Park. This represents a significant step forward for the emerging company. The company continues to look for space to lease to support its technical and research operations.

Recovery of Li Salts and Rare Earth Metals from Ionic Solutions

During August 2020, EA and UNLV began a comprehensive review and assessment of several technologies related to the recovery of lithium metal and certain rare earth metals from ionic solutions, based on methods and technology developed by Dr. David Hatchett. This review, and the identification of potential licensees has continued. This technology has potential application to recycling/recapturing metals found in lithium batteries that are common in automobiles and electronic devices. Current discussion between EA and UNLV includes developing a management team and forming a company that can further the development of this technology. Efforts to advance and commercialize this technology have continued during the reporting period.

Current Reporting Period Highlights:

Key updates from the reporting period include, with the strong support of the EA team, several additional potential licensees of the IP that covers the subject technology were identified and have been contacted. One of these partners, a chemical company based in Asia, has visited UNLV as part of their due diligence. UNLV and the company are in active discussions for a patent license. In addition, the company and UNLV are in active discussions around the company opening an operating subsidiary in Southern Nevada.

It should be noted that during the reporting period there have been ongoing discussions with four U.S. based companies, including one with a significant presence in Nevada, regarding the licensing of the technology. The prosecution of patent applications continues with both active and aggressive pursuit of international patents to protect the subject invention.

Other Project Developments:

Technology Patent Licenses

A license agreement granting certain patent rights to the Electrical Potential for Nano Manufacturing and Machining Difficult-To-Cut Materials invention was executed during May 2020. The license will require payment of a royalty to UNLV based on net sales of products by the licensee that rely on the licensed patent rights. It is not anticipated that royalties will be paid until sometime during the 2023 calendar year. During the reporting period the licensee confirmed its efforts to continue to develop products based on the licensed technology.

Licensing Discussions

During the reporting period, meaningful discussions resumed with a large laboratory equipment manufacturer that are focused on the potential licensing and commercialization of a unique innovation developed by Dr. Michael Pravica. This technology was reviewed and benefited from the de-risking program. The technology is generally titled “Reflective Light Device” and is a device and method for improved spectrometry observations. It is hoped that a license will be concluded in the next 90 days.

Engagement with EA

UNLV formally engaged EA to provide professional services necessary for the successful execution of this project. The formal engagement became effective July 23, 2019. Under that

relationship, UNLV shared information and documents with EA, on a confidential basis, related to university inventions. These documents include patent intellectual property filings, internal invention disclosures, and any other related research materials. EA provided an in-depth evaluation of each technology and made recommendations to increase commercial viability. Further, EA opened their network of subject matter and industry experts to UNLV to increase the likelihood of achieving intended commercial outcomes.

The relationship with formed under this project formally concluded on June 30, 2022. However, the “spirit” of this project continues and UNLV and EA remain in active communication with a focus on the identification and continued development of UNLV innovations that are believed to have commercial potential.

Budget

The following table provides project expenditures and the remaining budget for the reporting period. Expenditures included a payment to EA for professional services related to the evaluation and de-risking of UNLV innovations as well as funding provided under the Translational Grant Fund.

This project was extended in order to accomplish all goals and objective of the program. An extension of funds was granted extending the project through June 30, 2022.

Project Expenditures

Budget (Expended and/or obligated): \$276,552 (92.2%)

Remaining Budget (Not expended or obligated): \$23,448** (7.8%)

Project Expenditures				
For Reporting Period				
March 1, 2022 – August 31, 2022				
	Program Budget	Actual Expenditures To Date	Actuals plus Obligations	Remaining Budget
Professional Services	\$ 101,267	\$ 101,264	\$ 101,264	\$ 3
Commercialization Grants	\$ 192,285	\$ 170,246	\$ 170,246	\$ 22,039**
Personnel Expenses	\$ 6,448	\$ 5,042	\$ 5,042	\$ 1,406
Total	\$ 300,000	\$ 276,552	\$ 276,552	\$ 23,448

** An obligation of \$7,000 remains associated with this line/category item and is not shown in the amounts above as the invoice from that associated vendor was received after the June 30, 2022 funding period of this project.

For Reporting Period
 March 1, 2022 – August 31, 2022

	Reporting Period Actuals	Previous Reporting Periods	Total
Technologies Assessed	0	39	39
Jobs Created	2	3	5
Businesses Created	1	1	2
Patent Applications Filed	3	5	8
Executed License Agreements	0	2	2

Additional Knowledge Fund Reporting Requirements

Public Benefit

This project will provide benefits to the public and the local community in the form of new businesses, job growth, and economic dynamism. New businesses are typically the primary source of job creation in the American economy. Newly created businesses also contribute to economic dynamism by injecting competition into markets and spurring innovation.

The Kauffman Foundation reports that businesses with fewer than 50 employees represent over 95% of all U.S. companies and these young startups are the firms most likely to lead to job creation. New businesses account for nearly all net new job creation and almost 20 percent of gross job creation. Additionally, companies less than one-year-old have created an average of 1.5 million jobs per year over the past three decades.¹

By commercializing UNLV technologies through successful license agreements or the formation of startup companies, this project will foster innovation in the marketplace and create jobs with high growth potential for the local economy.

Research Faculty

All current UNLV research teams and faculty jobs have been retained during the project. This project has not resulted in the hiring of any additional UNLV research teams and faculty. Initial funds allocated to this project have been used to employ EA services related to the de-risking and evaluation of technologies, see the Budget section for additional information.

¹ <https://www.kauffman.org/what-we-do/resources/entrepreneurship-policy-digest/the-importance-of-young-firms-for-economic-growth>

It should be noted that as a result of the disbursement of funds through the Translational Grant Fund, several graduate students and undergraduate students were hired/supported with each contributing to the development of the funded projects.

Research Laboratories

During the project, there has not been any use of research laboratories or related equipment beyond that which is already being performed by current UNLV research faculty.

One of the most promising technological developments pertains to the Fire-Retardant Polymer technology where EA and FireSafe Zone are partnering with the State of Wallonia, Belgium and IIT Madras (India) to assist with the development of the proprietary polymer. FireSafe Zone is making efforts to find students with a connection to these locations to hire to work on the project.

Research Clinics, Institutes, and Facilities

There have not been any research clinics, institutes, facilities, or related buildings created as a result of the project.

Current Research Efforts

Funding allocated from the Knowledge Fund will be to provide translational “Gap-Funding” to UNLV researchers in support of projects identified as having high commercial potential. In total, six (6) projects were funded and continue to advance toward commercialization.

Patents and Intellectual Property

During the reporting period a total of three (3) new patent applications were filed targeted at three separate innovations as a result of this project. Each of the three applications was directed at subject inventions believed by the de-risking team to have potential of commercial success. Although this project is primarily focused on the commercialization of existing UNLV intellectual property the three new patent applications were necessary to increase the likelihood of finding a commercial development partner.

Research Grants, Gifts, and Donations for Research Teams

To date, no research grants, gifts, or donations have been received for this project. Notwithstanding the foregoing, several SBIR/STTR grant applications are currently being prepared. In addition, FireSafe, a Nevada start-up and licensee of certain UNLV patents, successfully raised \$200,000 during the reporting period.

Research Grants, Gifts, and Donations for Knowledge Fund Account

To date, no research grants, gifts, or donations have been received for this project.

Federal and Private Grant Matching Funds and Contract Opportunities

There have not been any matching funds for federal or private sector grants or contract opportunities that support economic development as a result of this project.

Business Growth and Impact

In total two (2) business have been started as a result of this project; FireSafe Zone and Quantum Copper, Inc. It is anticipated that one additional patent license will be executed prior to the end of the calendar year. It is also noteworthy that UNLV and EA continue discussions with a large international based company related to establishing an operating entity in Southern Nevada.

Job Creation and Impact

Five new jobs were created to date as a result of this project. NoFire Zone, Inc. created two executive/founder positions along with two additional executive positions within their organization. Additionally, No-Fire has hired a Director of Research. All current EA employees and UNLV research faculty related to technologies that are being evaluated have been retained.

Workforce Development

No workforce development and training, such as certificate programs and degree programs, has been created as a result of this project.

Appendix A:

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