Nevada Governor's Office of
ECONOMIC DEVELOPMENT

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November 01, 2022

The Honorable Steve Sisolak
Office of the Governor
One Hundred One North Carson Street
Carson City, Nevada 89701

Ms. Brenda Erdoes, Director
Legislative Counsel Bureau
401 South Carson Street
Carson City, Nevada 89701

Re: Nevada Knowledge Fund Annual Report 2022

Governor Sisolak and Director Erdoes:

NRS 231.1595 requires the Executive Director to report annually to the Governor and to the Director of Legislative Counsel Bureau on the progress of the Knowledge Fund. The attached report is for the period covering November 1, 2021, through October 31, 2022.

Since its inception, the Knowledge Fund has demonstrated substantial returns on investment for Nevada's economy and positively impacting every Nevadan:

- At the University of Nevada Reno (UNR) the Knowledge Fund has
  - Created more than 710 jobs by affiliated companies;
  - Located more than 47 companies with university-based operations;
  - Raised more than $35.2M in grants and contracts;
  - More than 375 companies and organizations engaged through memberships or agreements;
  - Affiliated companies raised $198.8M in Venture Capital funding;
  - Created a Living Lab for autonomous vehicle technologies in Reno-Sparks.
- At the University of Nevada Las Vegas (UNLV) the Knowledge Fund resulted in
  - Five spinout companies, 82 patents filed;
  - $28.98M in sponsored research awards and $6.87M in gifts and donations;
  - Spinout companies *HeligenicsQuantum Copper, NoFire Zone* have been continuing to raise seed and venture capital funding and have been supported by the State's Venture Capital Program *Battle Born Growth*;
  - 127 students and interns have been engaged with projects;
  - Black Fire Innovation facility is a direct result of the Knowledge Fund.
- At the Desert Research Institute (DRI) Knowledge Fund investment
  - Created the Healthy Nevada Project, a population health study that is examining genetic and environmental risks for certain diseases;
  - Established a partnership between DRI and Renown Healthcare, as a direct result of the Healthy Nevada project, culminating in the creation of the Renown Institute for Health Innovation (IHI);
  - Introduced a Commercialization Fellowship Program and the launch of an Entrepreneur in Residence Program;
  - Formed four spinout organizations most prominently *Tu Biomics* which has continued to raise additional seed funding rounds from venture investors, including the State's Venture Capital Program *Battle Born Growth* and strategic industry partners;

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- Created *WaterStart*, now operating independently, which has evaluated more than 400 technologies for members, and deployed 42 technology pilot projects leading to $3.2M in investments.

Sincerely,

10/24/2022

Michael Brown
Executive Director

cc:

Yvanna Cancela, Governor's Chief of Staff
Amy Stephenson, Director, Governor's Finance Office
Wayne Thorley, Senate Fiscal Analyst
Sarah Coffman, Assembly Fiscal Analyst
Morgan Barlow, Program Analyst, Fiscal Analysis Division
Tiffany Smorra, Executive Branch Budget Officer, Governor's Finance Office
Michele Lynn, Director of Administration, Governor's Office of Economic Development
Karsten Heise, Governor's Office of Economic Development

Nevada Knowledge Fund Annual Report 2022
for the period covering November 1, 2021 through October 31, 2022
(Project- and activity descriptions below were provided by the individual projects' semi-annual reports)

I. Active main projects for the Reporting Period

A. Applied Research Collaborative (UNLV)

Project Inception: October 2021
Total Funds Awarded (all years): $1,786,668. —
Project Status: New Project
Contract End Date: June 30, 2023

The UNLV Applied Research Collaborative (ARC) is housed at the Lee School of Business' Center for Business and Economic Research (CBER), with support facilities and activities at Black Fire Innovation and the UNLV Incubator. This support will provide dedicated funding to the applied research mission that has proven so successful at UNLV's sister institution, UNR, with its Nevada Center for Advanced Research (NCAR). In that spirit, this new UNLV program will result in business research coverage of the entire state via a number of services that enhance the competitiveness of Nevada's businesses – and help attract new ones - by supporting and improving the environment for interdisciplinary collaboration private and public entities. To achieve these outcomes, this initiative will:

i. Establish collaborative relationships between academic and business leaders to promote innovation, research programs, and startups to address real-world and marketplace problems.
ii. Produce a business plan that leads to the development of a facility with flexible laboratory space that will bring together academia, private industry, and venture capital to test and commercialize brand new technologies and companies in and around all disciplines.
iii. Connect industry partners with governmental agencies to promote pilot programs, research initiatives, and other collaborations.
iv. Facilitate access to cutting-edge research labs, incubators, and accelerators across Southern Nevada in a way that develops and diversifies the economy while providing students and faculty with real-world access to data, expertise, and startup support.
v. Build interdisciplinary teams of faculty, scientists, postdoctoral students, and grad students to solve industry problems, including those in priority science areas.
vi. Provide access to an innovation ecosystem that includes incubation, acceleration, and business mentoring at the UNLV Incubator, UNLV's Black Fire Innovation accelerator, Troesch Center for Innovation and Entrepreneurship, the Small Business Development Center (SBDC), the UNLV School of Engineering, and the UNLV School of Medicine.
vii. Provide co-working space for Nevada's university communities and local startups, leveraging world-class facilities including the $35M Harry Reid Research and Technology Park facilities or other facilities in the community.

Main activities for the reporting period include:

- Via its Knowledge Fund-driven partnership with Rainmaking.io/Aspire, the UNLV Incubator powered by Hughes launched its first faculty and staff entrepreneur cohort. The program was designed in August 2022 onsite at the UNLV Incubator facility. Representatives from Rainmaking/Aspire worked with UNLV faculty (Dr. Robert Rippee) to develop the eight-week program. Given the unexpectedly high level of inquiry and interest, Aspire and the UNLV Incubator decided to operate dual cohorts instead of a single, and to stagger them by approximately two weeks. The first cohort launched on September 26. The Second cohort will launch on October 17.
    - The first cohort is composed of faculty with specific ideas for commercialization while the second is composed of faculty who are responsible for programs where innovation can occur.
    - The program is based on two important components of the commercialization process: market assessment and customer discovery.
    - The modules provided by Rainmaking/Aspire are primarily on- demand supplemented with a weekly workshop and team venture coaching sessions. In addition, the UNLV Incubator host two on-site workshops on Regulatory/NSHE Requirements and Intellectual Property.
- In September 2022, the Knowledge Fund-supported Black Fire Innovation building added a "unicorn floor", featuring the opening of a global HQ for Sightline Payments, Southern Nevada's first-ever fintech unicorn. Funded in part by Vegas Golden Knights owner Bill Foley, Sightline is leading societal and consumer shifts to a cashless economy.
- Broke ground on first standalone "big tech" facility, with T-Mobile, to partner with UNLV programs in telecommunications, 5G and 6G technology, engineering, computer science, and women-in-tech innovation, becoming our first "marquee building" at the UNLV Tech Park.
- Won $2.1M EDA grant in support of opening a brand new "Black Fire in the Historic West Side" of Las Vegas, with support of Congressman Horsford and Senator Cortez Masto. This facility will open in the next reporting period, and will focus on tourism startup and small businesses, especially those that qualify as Disadvantaged Business Enterprises. This project will also support three economic development plans, authored by UNLV, to diversify the tourism industry further into medical tourism, sports tourism, and cultural- arts tourism sectors.
- Continued to add new startups to Black Fire bringing the total to nearly 100 companies in the UNLV Tech Park overall. In total, these companies are worth more than $3.2 billion – and many of these entities lacked a Nevada footprint before these facilities opened.
- $50,000 of ARC's UNLV Commercialization fund, was allocated to the President's Innovation Challenge (PIC) to support the top 3 winning teams. 2022 marked the inaugural year for the PIC -- a team competition open to undergraduate and graduate students at UNLV, to encourage social and business entrepreneurship that helps solve major problems in Southern Nevada. The challenge was spearheaded by UNLV's Office of the President, Graduate College, and the Office of Economic Development. The event was an overall success and it is anticipated to flourish in coming years.

B. Anchoring a Commercialization Ecosystem for Environmental Technologies and Know-How (DRI)

Project Inception: October 2021
Total Funds Awarded (all years): $1,496,096. —
Project Status: New Project
Contract End Date: June 30, 2023

This new project aims to create an ecosystem at the Desert Research Institute (DRI) where there is ongoing opportunity for faculty to nurture any ideas that have the potential to contribute to economic development, an understanding of the different paths to commercial viability, and an accounting of the resources available to bring to bear in pursuit of such success. This ecosystem framework is intended to reflect DRI's existing "bottom-up" culture.

The project consists of two components:

1. A program of progressive education and training for groups of DRI faculty and staff (*Commercialization Fellowship*). Short, workshop-type interactions will be provided for a broad range of faculty and staff in order to raise the level of sophistication across the board with respect to technology transfer and commercialization. One or two dozen faculty-driven ideas will be selected through a competition for further refinement in more focused workshops and one-on-one mentoring and further winnowed through meeting of milestones and other factors to a handful of project ideas that will be developed more intensively by the faculty members, office of the Vice President of Research (VPR), and outside resources to include other Nevada System of Higher Education (NSHE) institutions, regional non-profit organizations, and out-of-state direction and mentoring as needed.

   Progress made:

   - Nine members of DRI's faculty participated in the first phase of the fellowship program. Instruction was provided by StartUpNV drawn from their incubator program.
   - Five members are in progress for the second phase, two are in active negotiations with industry partners over licensing of IP and further R&D agreements.
   - Partnered with UNLV's Hugh Center incubator which has included three members of DRI's faculty in the 5-week intensive incubator program in partnership with Aspire (this is demonstrating 'cross Knowledge Fund project fertilization').

2. Encouragement and support for obtaining funding through federal Small Business Innovative Research (SBIR) and Small Technology Transfer Research (STTR) federal programs. Through a matching program enabled by the proposed project, DRI aims to incentivize faculty to participate more fully in obtaining and using SBIR/STTR program funds. Although the sectors of interest will not be limited intentionally, due to the nature of DRI research it is likely that the technologies that will be introduced into the project will have a strong environmental or climate component.

   Progress made:

   - Two DRI faculty have collaborated with industry partners on SBIR/STTR proposals, at least two Commercialization Fellowship participants are actively planning to seek SBIR/STTR funding to advance development of their ideas.

Currently, the project is expanding by initiating a new Entrepreneur in Residence (EIR) program in partnership with the UNLV Technology Transfer Office to hire two EIRs who will identify commercializable technology at DRI and UNLV, form a startup company, and lead that startup company to a successful spin-out from the campus. A project manager based at UNLV will oversee the implementation of the EIR program with sufficient oversight from leadership at both campuses to ensure that the resources and time of the EIRs is shared equitably between the two campuses.

C. Nevada Center for Applied Research (UNR)

Project Inception: October 2015
Total Funds Awarded (all years): $8,084,696.—
Project Status: Current Project
Contract End Date: June 30, 2023

The Nevada Center for Applied Research (NCAR) is a stand-alone, fully functional applied research and development technology center that serves to enhance the global competitiveness of Nevada industry by leveraging the physical and intellectual assets of the University of Nevada, Reno (UNR). NCAR's mission is to stimulate regional innovation-based economic development (IBED) by aligning the needs of industry, startup companies, researchers, and entrepreneurs with resources at UNR. This is achieved through:

i. Establish collaborative relationships between industry and academia that promote open innovation research programs and scientific studies to address real-world problems.
ii. Facilitate industry access to cutting-edge shared research laboratories and sophisticated instrumentation and equipment.
iii. Build an interdisciplinary team of faculty, scientists, postdoctoral students, and grad students to work on ongoing or one-off projects, or new-complex developments.
iv. Provide access to an entrepreneurs' support network that includes incubation and business mentoring from experienced entrepreneurs and executives.
v. Provide reduced cost co-working space available to the University community and local startups.

Main activities for the reporting period include:

- 48 companies received NCAR services
- 36 companies are using NCAR facilities
- 13 new affiliated companies onboarded
- 51 new jobs created by onboarded companies
- $2.48million grants awarded
- $61.8million venture capital/ investments received by all NCAR affiliated companies
- Launched *Nevada Autonomous*, a new program to manage and enhance Nevada's Unmanned Aircraft Systems (UAS) Test Site activities. The UAS Test Site service was created following Nevada's designation by the FAA as one of seven states to serve as a center for the development and testing of unmanned autonomous vehicles and systems.
    - Completed the transition from NIAS to NCAR-Nevada Autonomous, with all interlocal agreements executed.
    - Nevada Autonomous will be responsive to opportunities statewide and will collaborate with projects developed through the University of Nevada, Las Vegas, and Desert Research Institute. Nevada Autonomous took operations from the Nevada Institute for Autonomous Systems (NIAS), which is no longer in operations.
    - The new alignment better incorporates UAS Test Site activities with the aeronautical, autonomous vehicle and robotics research happening at the three research institutions of the Nevada System of Higher Education, while continuing to also facilitate testing opportunities with business, industry, and government agencies.
    - Since Nevada Autonomous officially started to operate in June 2022, it has already won a competitive grant from the FAA to work with ANRA Technologies and uAvionix in a project to incorporate broadcast-based, remote, ID (B-RID) into

the USS network to achieve combined broadcast and network RID.

- The shared sterilization room at the Applied Research Facilities (ARF) is fully operational now. Improved several other labs in ARF, which has made the building on campus a very active hub and central location for companies, entrepreneurs, faculty, and students to develop applied research with major focus on (but not limited to) life sciences and robotics.
- As a result of a collaborative agreement that was signed in October 2021 between UNR (through NCAR) and the Province of Misiones, Argentina (through Silicon Misiones), one of its affiliated companies, Macoma Environmental Technologies, LLC (a Nevada-based company), became the first photocatalytic industry to participate in this mutual exchange and the first NCAR company to operate internationally, in Argentina. Consequently, Macoma is now an international company. Besides its affiliation to NCAR, Macoma is also a member of the United Nations Environmental Program (UNEP), the Global Alliance for Buildings and Constructions (Global ABC), and the US Green Building Council.

The Living Lab component of NCAR is proving to be an excellent real-world experimental platform on which to pilot new concepts, discover engineering limitations, and develop solutions. Primarily, the issues of network management, sensor data quality, sensor fusion, computer vision, and cybersecurity are seen as the near-term practical research areas in which to invest development time and effort:

- The Digital Twins project, in collaboration with RTC Washoe and the Federal Transit Administration (FTA), is about 95% completed; moving into the final testing phase to demonstrate that the system will be beneficial to RTC Washoe, maintaining a digital twins of transit infrastructure with the objective of improving efficiency and reducing maintenance costs.
    - The Digital Twins project was successfully presented to the FTA and, after the pilot program is completed, RTC Washoe is considering implementing the system on several electric buses from its fleet.
    - The instrumentation of each bus with 3D laser scanners (lidar), GPS, and cameras, will allow RTC Washoe to cost-effectively monitor and improve facilities maintenance for the transit infrastructure in large areas of the city.
- The NCAR Intelligent Mobility team has been working with the City of Reno and RTC Washoe to develop a centralized data collection system for public transit and infrastructure systems.
    - The cutting-edge research in this area has triggered the creation of a UNR-spinout company called LiDAR Matrix, Inc., which will provide services to transit agencies applying LiDAR (Laser-Light Detection and Ranging) data and patented AI-technologies. LiDAR Matrix. Inc. has four-related, pending patents that were submitted through UNR. The company is working on a new patent and also setting up software usage agreements with UNR.
- After extensive communications with Khalifa University, researchers in Abu Dhabi, UAE, starting a collaboration based on Autonomous Vehicle data collection, annotation, and dissemination, and will be expanding to more projects in the future.
- All Living Lab sensors in Reno and Henderson are installed and the infrastructure is completed. The Living Lab connected infrastructure is one of the largest of this type in the world right now.

The Sierra Accelerator for Growth and Entrepreneurship (SAGE) program supports community and economic development by providing SBIR/STTR grant support services to Nevada businesses, innovators, and entrepreneurs:

- During the program period, SAGE received 25 applications from 21 companies, of which 77% were from Northern Nevada, while 23% were from Southern Nevada.

WolfCorps is designed to help move research beyond the university laboratory and guide the process of transferring research innovations into products and processes that benefit society. Based on the Lean Launchpad methodology developed by Steve Blank, WolfCorps offers researchers an immersive training experience where participants engage with industry leaders to identify challenges and develop targeted solutions:

- During the program period, WolfCorps received 15 applications from university teams and established Nevada businesses. Of these applications, four were invited to participate in the program. One company who participated in the program in a previous period was accepted into the National I-Corps program and will be receiving a $50,000 award for further company development.

D. Fraunhofer IVI Collaboration (UNLV)

Project Inception: May 2018
Total Funds Awarded (all years): $500,000.—
Project Status: Current Project
Contract End Date: December 31, 2022

The project task is to develop infrastructure supported perception for fixed locations to provide more consistent field of view and environmental perception for safe operation of autonomous vehicles in constrained environments. The project is comprised of the following main components:

i. Selection of appropriate sensing technologies for constrained environments (including camera, radar, lidar, or ultrasonic).
ii. Development of robust object detection and recognition algorithms for road users (e.g., cars, trucks, buses, and pedestrians) given a sensor package.
iii. Definition of communication scheme for safe 'connected and autonomous vehicles' (CAV) control at low speeds.

Main activities for the reporting period include:

- Fully functional real-time framework for detecting and track pedestrians using a combo radar and camera sensors was installed on Harmon St. on UNLV's campus. The collected data was used to build datasets to enable pedestrian behavior (trajectory) predictions which can be used to provide pedestrians with advanced warnings prior to crossing.
- Student-led Vehicle sensing and control project to develop pedestrian braking control algorithm for autonomous vehicles.
- Infrastructure to autonomous vehicle communication demonstrated ability of vehicle to brake within stopping area of a crosswalk. Future improvements will be concentrating on using predicted position and "time to stepping off curb data" to provide further safety margins.
- Received $539k award from the National Science Foundation (NSF) "*MRI: Acquisition of Connected Autonomous Vehicles (CAV) Infrastructures to Support Cooperation Human-Robot Driving and Pedestrian Safety*".

II. Projects that Ended during Reporting Period

E. Sports Research (UNLV)

Project Inception: July 1, 2019
Total Funds Awarded (all years): $1,750,000.—
Project Status: **Project Ended**
Project End Date: September 30, 2022

Southern Nevada is currently seeing significant growth in sports-related industries locating to, and being established in, the region. From a myriad of professional, amateur, student, and community- based industries and organizations, a unique opportunity exists to drive economic development and diversification through sports and parallel industries. Sports research and development (R&D) and innovation is no longer limited to just being beneficial to the business of the sports industry with most of the financial return on investments being held and experienced by business stakeholders. A 21st century vision of sports R&D must include interdisciplinary approaches, with clearly defined strategies to translate and adapt successful innovations to improve health and wellbeing for the overall population.

The UNLV Sports Research and Innovation Initiative's purpose is to:

i. Generate new products and services to the sports industries using interdisciplinary approaches.
ii. Partner with and grow Nevada-based companies with real-world opportunities for UNLV faculty, students, and graduates.
iii. Attract new companies to Nevada to diversify the economy with sports and its parallel industries.
iv. Conduct cutting-edge interdisciplinary research at UNLV with the translation of research to improve population health outcomes and reduce health disparities in Nevada and beyond.

Main activities for the reporting period include:

- Second annual Sports Research Summit held on May 6, 2022. Thanks to a partnership with UFC and Lawrence Epstein the event was held at the UFC Apex with over 150 attendees. This encouraged collaboration among faculty, students and industry partners. Sports related faculty and industry partners were given opportunities to highlight their companies and/or research.
    - Showcased Catalyst Accelerator Program awardees. Each awardee was given 5-10 minutes on the stage to present their research / innovation to all guests.
- 1TX which has moved their headquarters to Las Vegas from Israel to provide a one-of-a-kind technology to help companies accelerate smart, secure technology adoption with their proof-of-concept platform has agreed to become the sponsor of the SRII Catalyst Grant Program.
- The UNLV Sports Research and Innovation website is live and serves as a valuable tool to communicate the significant impact this initiative has within sports related research and innovation.
- Launched the SRII Special Events Internship Program in partnership with the Las Vegas Super Bowl Host Committee which will hire nearly 45 UNLV students. With an emphasis on diversity, equity, inclusion, and belonging (DEIB), all Super Bowl LVII Host Committee internship classes will focus heavily on recruiting diverse interns, leveling the field for opportunities to experience the many different elements of large-scale event execution. By

providing a livable wage and covering the cost of tuition, the Host Committee and UNLV hope to remove this barrier of entry for undergraduate and graduate students.

- Commercialization and Partnering with Industry:
  During the Fall 2021 and beginning of Spring 2022 semesters, the following activities have been focused on the following main partners
    - The Lake Las Vegas Sports Club continued with a donation ($25,000 / year) to support a graduate student for Fall 2021 – Spring 2022. During the Summer 2022, added a body weight support treadmill (Boost, Inc.) that is being used to provide feedback to the company regarding the treadmill performance and design.
    - Analysis of field data collection with Flo Cycling: This project was a continuation of work started in 2019 that involved testing rolling resistance of different wheel and tire combinations using different tire pressures. During Summer 2022, a graduate student conducted his thesis to determine procedures to quantify wheel vibration.
    - Wetsuit testing with HUUB Design: Core temperature during swimming in different wetsuits. The purpose of this project was to evaluate if a swimmer's core temperature was influenced while wearing different wetsuit designs. Data have been collected for a group of subjects and we are currently analyzing the results. A manuscript is currently in the review process. The work on core temperature is now extended into measuring skin temperature. Skin temperature sensors have been purchased and resuming data collection later this fall or early spring 2023.
    - Muscle activity during swimming in different wetsuits. The purpose of this project was to assess how active shoulder muscles are during swimming in different wetsuit designs. Data for this project have been collected and are currently being analyzed. This project is directly related to how a wetsuit is designed from a manufacturing perspective as well as the type of material used to build a wetsuit.
        - A manuscript is currently in the review process.
        - A prototype wetsuit was developed with the purpose of allowing more flexibility in the wetsuit design. The prototype was not successful but the concept is still being pursued.
        - A doctoral student completed his research on the influence of compression gear on muscle activity. This work has been submitted for publication.
    - Working with the wetsuit company (HUUB Designs) on a new wetsuit design as well as potentially developing a new deep-water running product.

F. Community Stakeholders Technology Commercialization (UNLV)

Project Inception: December 1, 2018
Total Funds Awarded (all years): $300,000.—
Project Status: **Project Ended**
Project End Date: June 30, 2022

The UNLV & Community Stakeholder Commercialization Project 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 start-ups established. The primary purpose was to implement new programs based on UNLV's Office of Economic Development (OED) engagement of qualified community groups, service providers, subject matter experts, serial entrepreneurs, and individuals to assist with the identification and assessment of UNLV inventions, as may be protected by intellectual property rights, for

commercial viability in order to "*de-risk*" the inventions and provide development and commercialization guidance and mentorship. The success of this initiative was measured through an increase in technologies licensed and startup companies formed. The OED actively engaged 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. The goal was to create one spin-out business and two licensing agreements per year.

- 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 UNLV faculty (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:
  - 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 $200k 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.
  - 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 is technical and research operations.
  - 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 which should yield more innovations and/or intellectual property being developed at UNLV.
    - GOED's State Venture Capital Program, Battle Born Growth, is a seed investor in Quantum Copper with $100k.

- Several potential licensees of Intellectual Property (IP) related to the recovery of lithium metal and certain rare earth metals from ionic solutions based on methods and technology developed by UNLV faculty (Dr. David Hatchett) that covers the subject technology were identified and have been contacted:
    - 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.
    - 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.

- 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.
- 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 UNLV faculty (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.

G. Construction Robotics (UNR)

Project inception: February 2020
Project Status: **Project Ended**
Total Funds Awarded (all years): $149,992.—
Project End Date: January 31, 2022

Construction Robotics aimed to develop technologies, methods, and systems, as well as the field prototypes that can enhance safety and automation in the construction process. This project emphasized a) autonomous and systematic tracking of construction progress, in combination with b) the partial automation and therefore support of timber construction through a mobile and dexterous robotic manipulation system operating alongside the human worker. Two demonstration cases were considered, namely one on automated construction progress tracking in an actual construction environment and a second on automated and human-collaborative timber construction within UNR's Autonomous Robots Arena facility.