

Sports Research & Innovation Initiative

Semi-Annual Progress Report

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

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Project Purpose

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 the majority of 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.

UNLV has a long history of conducting sports-related research that goes well beyond traditional sports medicine. From Sports Psychology and Nutrition, to understanding why sports attract a plethora of fans and followers, UNLV has a unique body of cross-disciplinary and dual application research, technologies, facilities, and experts in all sports-related fields. This expertise proliferates throughout the campus and into the community. For example, research on impact-induced concussions span not only sports, but also have significant applications to the military, automobile accidents, and criminal justice. Big data analysis on sports movements can be applied to identify early onset neural disorders such as ALS and Parkinson's disease. Even genetic research resulting in nutritional guidance for athletes can be applied to travelling in space and to broader population health benefits such as new treatments for autoimmune and endocrine conditions to support improved quality of life and healthy aging. The Sports Research and Innovation Initiative will impact not only sports, but the entire community at large, with potential profound impacts on overall population health improvements including addressing disparities in health.

The UNLV Sports Research and Innovation Initiative's purpose is to: 1) generate new products and services to the sports industries using interdisciplinary approaches; 2) partner with and grow Nevada-based companies with real-world opportunities for UNLV faculty, students, and graduates; 3) attract new companies to Nevada to diversify the economy with sports and its parallel industries; and 4) 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.

Section I: Progress

The following are the major accomplishments thus far as we continue to move the Sports Research and Innovation Initiative forward.

Major Accomplishment 1 – Business Updates

UNLV Sports Research and Innovation Initiative: An Ever-Evolving Space

In a moment that finds Southern Nevada in desperate need of economic diversification, UNLV's Sports Research and Innovation Initiative has launched at an ideal time. Drawing from dozens of campus researchers' work in the field, building upon the newly-approved Sports Management masters' program, and modeling itself after other successful industry-facing initiatives on campus, UNLV finds itself poised to lead and help develop Southern Nevada into what UFC Chief Executive Lawrence Epstein calls a "global intellectual capital of sports at UNLV."

UNLV's Sports Research and Innovation Initiative hosted the second annual Sports Research Summit on May 6, 2022. Thanks to our new partnership with UFC and Lawrence Epstein we held the event at the UFC Apex with over 150 attendees. The event was design to encourage collaboration among faculty, students and industry partners. Sports related faculty and industry partners were given opportunities to set-up booths to highlight their companies and/or research.

Additionally, we utilized this opportunity as a platform to showcase our Catalyst Accelerator Program awardees. Each awardee was given 5-10 minutes on the stage to present their research / innovation to all of our guests.

Lawrence Epstein served as our guest speaker and reiterated the importance of UNLV SRII being the hub of the global intellectual capital of sport and entertainment – Las Vegas. Lastly, we had a very exciting panel discussion as two board members of the Las Vegas Super Bowl Host Committee (Steve Hill – CEO of LVCVA and Virginia Valentine – President & CEO at Nevada Resort Association) discussed the first ever Super Bowl to be held in Las Vegas and the impact it will have on our community.

Finally, SRII also plans to partner with several different companies that highlight the different needs and developments in the up-and-coming Las Vegas sports scene. Starting with 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. 1TX has agreed to become the sponsor of the SRII Catalyst Grant Program.

SRII Website Maintenance

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. Some changes have been made to the original Pillars of Excellence in order to reflect the ever-evolving sport related research and innovation space as well as areas of research that are being conducted more prominently at UNLV. The Pillars of Excellence are highlighted as well as many of our faculty accomplishments within the areas listed below.

- Brain Health
- Diversity and Inclusion in Sports
- Esports
- Military Health and Performance
- PGA Golf Management Program
- Sport and Health
- Sports Betting
- Sports Business
- Sports Performance
- Sport Psychology
- Sport Technology

We encourage all of our constituents to learn more about SRII at sportsresearch.sites.unlv.edu

Major Accomplishment 2 – SRII Special Events Internship Program

SRII has officially launched the SRII Special Events Internship Program in partnership with the Las Vegas Super Bowl Host Committee. We will hire nearly 45 UNLV students to have a unique experience in learning how to organize and execute the greatest show on earth.

The traditional unpaid internship model for high-profile events such as the Super Bowl tends to favor students with financial means and social bandwidth. Students who rely on their own income or other assistance to pay tuition are often forced to choose a part time job over an unpaid internship.

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.

The collaboration with the Las Vegas Super Bowl Host Committee is the first official “paid” internship program for the Super Bowl. This is regarded as an NFL Super Bowl Legacy program which is why the NFL Foundation is also providing resources (\$100,000) to support UNLV Students. Additionally, the United Way of Southern Nevada has agreed to match the NFL Foundation commitment (\$100,000) to support this program which will have a direct effect on workforce development and diversity in sport.

Together we will prepare our students for the current economic shift within Southern Nevada, as we are experiencing a renaissance that will have a global impact on sport and our community.

The UNLV Sports Research and Innovation Initiative intends to utilize the SRII Special Event Internship program for many more events beyond the Super Bowl LVII in 2024.

Commercialization and Partnering with Industry

Research Project One: Sports Equipment for Endurance Performance, Dr. John Mercer

During the Fall 2021 and beginning of Spring 2022 semesters, the following activities have been focused on these main industry partners.

- Lake Las Vegas Sports Club
The Lake Las Vegas Sports Club continued with a donation (\$25,000 / year) to support a graduate student for Fall 2021 – Spring 2022. This student is the main point of contact for the Sports Science Satellite Lab at the club. We have continued to develop that laboratory with equipment and have had research projects conducted at that location. During the Summer 2022, we 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. Flo Cycling used these data to evaluate a new wheel design that was subsequently released late Spring 2020. We continued this work with Flo Cycling as the prototype of a ‘smart’ wheel has been developed. Unfortunately, the prototype has been delayed due to supply chain issues. During Summer 2022, a graduate student conducted his thesis to determine procedures to quantify wheel vibration.
- Wetsuit testing with HUUB Design.
There were two projects conducted in this research area:
 1. 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. A manuscript is currently in the review process.
 2. b. The work on core temperature is now extended into measuring skin temperature. Skin temperature sensors have been purchased and we will be 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. A manuscript is in the final stage of review process presently.

- b. The lead author on the manuscript was a doctoral student who is now an Assistant Professor at Texas A&M University – Kingsville.
 - c. Furthermore, 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.
 - d. A doctoral student completed his research on the influence of compression gear on muscle activity. This work has been submitted for publication (and the doctoral student is now an Assistant Professor at Augusta University).
3. I have also been working with the wetsuit company (HUUB Designs) on a new wetsuit design as well as potentially developing a new deep-water running product.

Other activities that have been accomplished Fall 2021 – Spring 2022:

- In collaboration with a colleague, Tedd Girouard, the podcast: The Evidence Based Triathlete has been launched. This weekly podcast draws on the academic knowledge of Tedd and myself in combination with our triathlon experience. The audience for the podcast is the immediate local endurance community but the podcast is now available on regular podcast stations.
 - We have reached over 5000 downloads via the audio version of the podcast and over 3000 views on the Youtube version of the podcast. In addition, the podcast is broadcast live on facebook.

Research Grants

Intellectual Property

One patent was filed for this reporting period by Michael Pravica, Physics and Astronomy - Development of high-quality reproducible vaccines via useful hard x-ray photochemistry

Programmatic and Project Changes

With \$100,000 still available to build on the success of the Catalyst Grant Program, the creation and of the Catalyst Accelerator program occurred in November 2021.

POC Catalyst Grants: Research Updates

- Joshua Goldman, School of Medicine - \$50,000
Monitored Compression Therapy: Using Smart Technology to Optimize the Treatment of LowerExtremity Swelling
 - One working prototype has been built and tested locally, measuring pressure applied at three levels on the leg: the upper calf, the lower calf, and the lower leg. A smartphone application has been designed and implemented for Android phones which connects to the leg sleeve wirelessly via Bluetooth and displays the pressure readings at each sensor level. Next steps (current work) include the addition of a temperature sensor for monitoring potential skin infection, the inclusion of an algorithm to measure/determine/quantify patient compliance with the device, and improving upon the smartphone application.
 - Major Accomplishments:
 - Limiting the device to a 1cm diameter
 - Achieving exceptional linearity with the sensing mechanism
 - Successful Bluetooth connection/communication between sensing mechanism and smartphone
 - NEW PUBLICATION: Monitored Compression Therapy: Using Smart Technology to Optimize The Treatment of Lower Extremity Swelling - James Skelly

- Yoohawan Kim, Computer Science - \$49,699
Developing a low cost mobile TBI analysis system for sports safety
 - We have developed Smart Walking Movement Master (SingM2) mobile application (app) to collect motion sensor data using the smartphone. SingM2 is a smartphone application that continuously collects walking movement data of its users. To achieve the primary goal of building a deep learning model with a high prediction accuracy, it is essential to gather specific data sets applicable to the research. We collected the sensor data from a traumatic brain injury (TBI) group. We constructed deep learning models such as feedforward neural networks and convolutional neural networks using Keras and Tensorflow. For training the models, we use the motion sensors data collected by the mHealth application. We examined the deep learning models with the motion sensors data of TBI group. Participants with TBI experience showed a lower body balance. For our mobile app to be usable by the users, a reporting service is necessary. We tested and researched the cloud service for the mHealth system using ThingSpeak™ cloud service. ThingSpeak™, representing a popular commercial version of cloud service, is an Internet-of-Things (IoT) analytic service platform to aggregate, visualize, and analyze the live data streams in the cloud.

- Hyunhwa Lee, School of Nursing - \$50,000
Mobile Health Walking Balance Measure for Accurate Sport-Related Concussion Treatment
 - On October, 2021, an international visiting post-doc scholar (Dr. Jinyoung Park) joined my team from South Korea for this project. She has been closely working with me (PI) for the project, along with the consultant in the project, Dr. Sungchul Lee in South Korea, to test and measure 3 app systems synchronously when assessing walking movement and balance. The new protocol, which will examine and test Aim 2 of the study, to recruit participants using the 3 app systems synchronously (front, back of the body, and right lower pocket) has been reviewed by Biomedical IRB (#UNLV-2021-198), since November 26, 2021. We responded to the reviewers 3 or more times, but haven't received an approval yet. Once it gets approved, we will recruit up to 70 participants including athletes.
 - NEW PUBLICATION: LEE, S. & LEE, H. (*LEAD/SENIOR/CORRESPONDING AUTHOR) (2022). DETECTION OF WALKING FEATURES USING MOBILE HEALTH AND DEEP LEARNING. *APPLIED SCIENCES*, 12(11), 5444. [HTTPS://DOI.ORG/10.3390/APP12115444](https://doi.org/10.3390/app12115444) (SCIE, IF = 2.679)
 - New Awards: \$10,000.00. UNLV School of Nursing, Intramural Research Grants Fall 2022: Dual-Task Home Exercise for Walking and Other Functions after Sports-Related Concussion. Principal Investigator.

- John Menzes/Brendan Morris, Electrical and Computer Engineering - \$50,000
Monitoring of Tissue Perfusion Through the Combined Use of Thermal, RGB and LIDAR Cameras
 - Desktop version of prototype device and associated data capture software completed
 - Pilot data collection was performed. The tourniquet study included 13 trials of 10 young adults for a total of over 36k images where 75% were used for training and 25% were used for testing.
 - A ResNet50 neural network was trained using the pilot data which showed promising classification results when identifying no perfusion, arterial or venous perfusion. Results show that by using small 224x224 images works better than larger 448x448 or full resolution images.
 - Updated multi-modal imaging system to use all FLIR machine vision cameras. The new version uses FLIR's Spinnaker API for fine control of camera parameters resulting in better imaging quality.

 - Performed stereo camera calibration (RGB + IR)
 - Deep learning-based Yolov5 model trained for hand and finger detection using two different public datasets (UGFD and TI1K).

- Completed tutorials on semantic segmentation using HR-Net with Cityscapes car data. Started converting RITE eye retina dataset to approximate hand dataset for segmentation of vessels.
- Performed tutorials on camera calibration to learn how to apply to the prototype device.
- Updated to use of Spinnaker API (through PySpin binding and Easy-PySpin wrapper) for improved camera control. Expected for use in V2 prototype.
- Brendan O'Toole, Mechanical Engineering - \$70,000
Experimental Study of a Patient-Tailored Polycarbonate Urethane Knee Implant Using Custom-Designed Test Machine
 - The design phase of the testing machine was finished during the last six months. A motion analysis was completed so that the final dimensions of the test cell drive linkages could be determined. These parts were then drawn up and sent to the machine shop for fabrication. In addition, thin sheets of potential bio-implant material were obtained which will be used for the initial experiments.
 - Accelerator Grant application accepted and funded.
 - ONE PH.D. DISSERTATION WAS COMPLETED: MARIA RAMOS GONZALEZ, "EXPERIMENTAL STUDY OF A POLYCARBONATE URETHANE KNEE IMPLANT USING CUSTOM-DESIGNED KNEE SIMULATOR", UNLV PH.D. DISSERTATION, SUMMER 2022.
 -
- Michael Pravica, Physics and Astronomy - \$50,000
Development of high-quality reproducible vaccines via useful hard x-ray photochemistry
 - We successfully conducted x-ray diffraction experiments at the Canadian Light Source in May demonstrating that the flux used there at the Brockhouse beamline was sufficient to cause damage in our samples on timescales less than one hour. We confirmed molecular damage using Raman, mid-IR and far-IR spectroscopies.
 - We successfully conducted x-ray diffraction and irradiation damage experiments at the Advanced Photon Source in July. We also discovered that the presence of water is very critical for accelerating x-ray induced damage. We are writing a paper on our results.
 - INVITED SPEAKER: "USING HARD X-RAYS TO DRIVE NOVEL CHEMISTRY," 3RD INTERNATIONAL CONFERENCE ON IONIZING PROCESSES (ICP) 2022, REMOTE PRESENTATION (7/11/22)
 - PARTICIPANT IN THE UNLV SPORTS RESEARCH AND INNOVATION FOUNDATION'S 2022 SPORT RESEARCH SUMMIT (5/6/22).
 - INVITED SPEAKER: "USING HARD X-RAYS TO DRIVE NOVEL CHEMISTRY," CAL POLY POMONA UNIVERSITY, POMONA, CA (3/17/22)
- Julia Silvernail, Kinesiology and Nutrition Sciences - \$75,779
The Healthy Runner (Run Healthy Mobile Application)
 - We have begun testing of the data inputs to the grant and are ordering remaining needed smart devices to complete testing for application information. We are in the final stages with the app developer to beta test the user interface and plan to have it ready to launch this Fall.
 - Accelerator Grant application submitted and funded.
- Brian Schilling, Kinesiology and Nutrition Sciences - \$84,991
"Fightpace" Mobile Application for Combat Sports Interval Training
 - Accelerator Grant application submitted and funded.
 - Programming in process for commercially-available app
 - New features added
 - Libraries updated

- Marketing support
 - Beta launch Sept. 30th.
- Presentation at the 2022 UNLV Sports Research Summit
- Kwang Kim, Mechanical Engineering - \$66,835
Field Deployable Modular 3D Printer for Sports Equipment
 - The accomplished design considers a printing platform that can expand the print volume. The print base and the support structure expand using modular components. This allows for easy assembly, disassembly, or expansion. During the reporting period several advancements have been made. Structural analysis work has been completed for the Modularly Expandable 3D Printer (ME3P) concept. To determine the optimum design, R&D was conducted on additive manufacturing, conventional 3D printing systems, general structures, the dynamics of robotic manufacturing systems, and market research. After the initial design concepts introduced, the engineering analysis took place. The analysis was conducted using analytical calculations in conjunction with finite element analysis using the software, SolidWorks. The project is in the prototyping phase. Conventional 3D printer systems are being used to fabricate some of the prototype components. The figure below shows our currently assembled ME3P prototype. The main problem for this prototype has been the tolerances. Future iterations of the frame will incorporate the extension pieces. Additional care will be put towards tolerancing the fittings to reduce post printing construction time
 - Accelerator Grant application submitted and funded.
 - PRESENTATION: Devin Krystek, John Faccinto, Alexandria Washington, Justin Neubauer, Nazanin Minaian, Zakai Olsen, and Kwang J. Kim, "Development of a Modular 3D Printer for Customizable Wearable Technology," SPIE Smart Structures and Nondestructive Evaluation, March 06-10, 2022, Long Beach, CA (PAPER #: 12045-2).
- Zhiyong Wang, Mechanical Engineering - \$49,349
Disinfecting Air Containing Viruses from Ventilators, Sports Facilities and Other Circulation Systems
 - The project has been finished after being tested at the university of Oregon
- Shengjie Zhai, Electrical & Computer Engineering \$50,000
An Artificial Intelligence assisted electronic sports (Esports) medicine and performance assessment system for optimizing Healthy body, healthy mind and high performance
 - This project is almost running as we proposed timeline. Firstly, the AI model has been built up and optimizing for the real word. Meantime, the AI model was used for engineering college summer camp. Second, our first paper was published at IEEE top conference of COMPSAC 2021. And the proposed system was submitted for a patent. Third, the second research collaborated with Dr. Dawn from the UNLV medicine school was submitted to IEEE journal of biomedical and health informatics and waited for the second-round review comments. The last work is under processing and will be finished soon. The results will be published at the end of this year.
 - Publications:
 - MULTI-CLASS CARDIOVASCULAR DISEASE DETECTION AND CLASSIFICATION FROM 12-LEAD ECG SIGNALS USING AN INCEPTION RESIDUAL NETWORK, IEEE ANNUAL INTERNATIONAL COMPUTER SOFTWARE AND APPLICATIONS CONFERENCE (COMPSAC) (2021)
 - ARTIFICIAL INTELLIGENCE IN THE RADIOMIC ANALYSIS OF GLIOBLASTOMAS: A REVIEW, TAXONOMY, AND PERSPECTIVE, FRONTIERS IN ONCOLOGY, (2022)

- ON AN EDGE-END ECG SIGNAL STRATIFICATION AND OF PREPROCESSING ALGORITHM IN SUPPORT OF IOT-BASED REMOTE CARDIAC MONITORING, IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS, (2022)

PSD Catalyst Grants: Research Updates

- Christopher Cain, PGA Golf Management University Program - \$8,785
Golf Grip Study
 - Data collection for both phases of the study are completed and white papers (results of product performance) was completed in October 2021
- Brendan O'Toole, Mechanical Engineering - \$100,000
Commercialization Development for Rebel Roof Rack
 - A website has been created and is updated regularly with project updates. Please see the website for some videos and other information not included in this report.
 - <https://www.mojaverail.com/>
 - Noah Malgeri and Rachel Elias completed an NSF ICorps Seed Grant where they were able to do a preliminary 'Customer Discovery' evaluation as part of the Business Model Canvas.
 - Fabrication and Testing of Roof Rack Prototype 1 (Sept 2020 – May 2021). A video demonstration of this prototype can be viewed on the website link above.
 - Redesign and Fabrication of Prototype 2 (May 2021 – December 2021). A telescoping rail system with a simpler round geometry was used to design a second prototype. A CAD model of this system is shown below.
 - A new tower support system was also designed and fabricated.
 - All of the individual components for this second prototype were manufactured by December of 2021.
 - Assembly of Prototype 2 (January 1 - February 28, 2022). Custom cylindrical bearings were designed to allow the tubes to telescope. Several iterations of these bearings were fabricated during the first two months of 2022.
 - Final assembly and testing of this prototype is scheduled for April – June of 2022.
- Kara Radzak
Healing the Everyday Athlete – Evaluating the Impact of Incrediwear Use on Musculoskeletal Health in an Occupational Setting
 - Data collection phase: Currently have one research site in data collection, 80 participants are in phase 1 of the collection. Phase 1 data collection will be completed by then end of the funding period.

Looking Forward

Identify industry needs and engage to create collaborations that will benefit the Las Vegas community and our growing sports research and innovation presence.

Leadership Updates:

- There has been a transition within the Coordinator role and we plan to elevate the position and make a new higher for the upcoming year.

Engagement & Revenue Generation:

- Build a facility that addresses the needs of the sports industry and academics

- Develop the first Sports, Entertainment & Innovation Conference (SEI-CON)
- Engage corporate partners
- Create new innovations
- Collaborate with sports and human performance industry
- Data Analytics
- Innovation
- Wearable Technology
- Diagnostics and Therapeutic Devices

Impact Workforce Development

- Student Engagement - Research
 - Commercialization of Innovative Products & Research
 - Support Research Initiatives
- Student Engagement - Careers
 - Startup Companies
 - Diversify Job Creation within the Sports Industry
 - Career & Internship Placement
 - Creation of the New UNLV SRII Internship program

Create a learning environment that will maximize all of our internal and external engagements to advance research and innovation opportunities by providing our students the platform to learn about the many facets of sports research and innovation.

Section II: Performance Narrative

Following are the outcomes we expect to generate from this research as originally proposed in our grant application. Our hope and mission are to develop sufficient funding such that these outcomes can still be accomplished within five years:

- Six (6) new startup companies from direct Sports Research and Innovation Initiative activity
- At least five (5) new products and/or services licensed to existing companies for commercialization
- \$7,950,000 in grants and corporate funding over five years
- At least \$3.6M in donations over five years
- Establishment of interdisciplinary Sports Research and Innovation Initiative lab and clinics at UNLV
- Twenty-eight (28) research sponsorships over five years
- \$500,000 in license revenue over five years
- Creation of over 897 jobs (direct and indirect) over five years
- Research translation into at least two (2) new UNLV interdisciplinary initiatives to improve population health outcomes in Nevada

Performance Metrics

GOED Requested Metrics	Current Result / Year-End						
	07/01/19 - 09/30/19	10/01/19 - 02/29/20	03/1/20 - 09/30/20	10/01/20 - 02/28/21	3/1/21 - 9/30/21	9/30/21 - 2/28/22	3/1/22 - 8/31/22
Number of companies that moved to Nevada as a result of the project (cumulative)	0	0	0	0	0	0	0
Number of start-ups (cumulative)	0/6	0/6	0/6	0/6	0/6	0/6	0/6
Number of jobs created (cumulative)	0	0	0	0	0	0	0
Intellectual property licenses/options (cumulative)	0/5	0/5	0/5	0/5	0/5	0/5	0/5
Intellectual property revenue received by the University (cumulative)	0	0	0	0	0	0	0
Number of research grants awarded to (and received) by research teams and faculty	2/12	2/12	9/12	12/13	16/17	20/21	7
Amount of research funding received by the research team from industry or public sector agencies (per period)	\$400k	\$400k	\$396,047	\$335,526	\$335,627	\$329,962	\$123,500
Number of sponsored research contracts executed on behalf of the research team (per period)	0	0	1	3	3	3	3

UNLV Sports Research & Innovation Initiative

Number of patent applications filed (per period)	0	0	0	0	0	3	1
Number of issued patents (per period)	0	0	0	0	0	0	0
Number of students placed with companies (per period)	0	0	0	0	0	1	4
Number of faculty / students / temporary hired (per period)	0	3	4	0	2	26	22
Amount/value of gifts/donations received by UNLV in support of the research team (per period)	\$150k	\$150k	\$150k	\$150k	\$150k	\$250k	\$38,500K
Total number of student internships (per period)	2	2	2	2	3	3	4

Section III: Budget

Company: University of Nevada, Las Vegas

Period: FY 2022 - 08 February

Worktags: Grant: GR08858 UNLV-Sports Research and Innovation Initiative

Ledger Account Summary	Original Budget	Budget Amendments	Current Budget	Current Period Actuals	LTD Actuals	Obligations	Commitments	Actuals + Obligations + Commitments	Remaining Budget	Percent Remaining
Direct Expenses										
Personnel Expenses	\$2,958,000.00	(\$2,557,267.00)	\$400,733.00	0.00	\$337,554.09	\$0.00	0.00	\$337,554.09	\$63,178.91	15.77%
Professional Salary	\$2,900,000.00	(\$2,603,953.00)	\$296,047.00	0.00	\$261,238.80	\$0.00	0.00	\$261,238.80	\$34,808.20	11.76%
Graduate Salary	0.00	\$0.00	\$0.00	0.00	0.00	0.00	0.00	0.00	\$0.00	0.00%
Hourly Wage	0.00	\$31,093.08	\$31,093.08	0.00	\$12,802.05	\$0.00	0.00	\$12,802.05	\$18,291.03	58.83%
Fringe Benefit Expense	\$58,000.00	\$15,592.92	\$73,592.92	0.00	\$63,513.24	\$0.00	0.00	\$63,513.24	\$10,079.68	13.70%
Other Direct Expenses	\$1,352,000.00	(\$1,278,441.00)	\$73,559.00	\$229.42	\$5,431.25	0.00	\$0.00	\$5,431.25	\$68,127.75	92.62%
Travel Expenses	\$30,000.00	(\$27,525.00)	\$2,475.00	0.00	\$974.78	0.00	\$0.00	\$974.78	\$1,500.22	60.61%
Materials and Supplies	0.00	\$9,126.00	\$9,126.00	0.00	\$4,087.15	0.00	0.00	\$4,087.15	\$5,038.85	55.21%
Services	\$22,000.00	(\$15,743.00)	\$6,257.00	\$229.42	\$369.32	0.00	0.00	\$369.32	\$5,887.68	94.10%
Sub-Awards	\$1,200,000.00	(\$1,144,299.00)	\$55,701.00	0.00	0.00	0.00	0.00	0.00	\$55,701.00	100.00%
Tuition and Fees Expense	0.00	\$0.00	\$0.00	0.00	0.00	0.00	0.00	0.00	\$0.00	0.00%
Capital Equipment	\$100,000.00	(\$100,000.00)	\$0.00	0.00	0.00	0.00	0.00	0.00	\$0.00	0.00%
Total Direct Expenses	\$4,310,000.00	(\$3,835,708.00)	\$474,292.00	\$229.42	\$342,985.34	\$0.00	\$0.00	\$342,985.34	\$131,306.66	27.68%
Facilities and Administration Expense	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Direct & Indirect	\$4,310,000.00	(\$3,835,708.00)	\$474,292.00	\$229.42	\$342,985.34	\$0.00	\$0.00	\$342,985.34	\$131,306.66	27.68%

Note: the Personnel Expenses were reverted June 30, 2021. Budget snapshot continues to reflect these amounts, but they are not available to spend.