1. **What is your level of proficiency in conversational Spanish?**  
   **Spanish Speaking Level:** 2
2. **Describe your level of experience using marker-based or markerless biomechanical video capture systems, if any.**  
   I have substantial experience with both marker-based and markerless motion capture systems. At Wake Forest, I gained exposure to Kinetirax, while at Point Loma, I have conducted motion capture using both markered and markerless systems. I have experience with Motion Analysis and Qualisys in our main lab for markered data collection, as well as Theia utilizing Miqus cameras for markerless captures. After data capture, I use Visual 3D pipelines to extract the necessary information depending on the project requirements.
3. **What are three books you've read in the last 12 months that have impacted your personal or professional life, and how did they change your thinking?**  
   **a. Introduction to Robotics: Mechanics and Control**  
   I am currently reading *Introduction to Robotics* for my thesis project, specifically focusing on Chapter 6, which covers Manipulator Dynamics. This chapter explores how acceleration and inertial tensors from external frames contribute to dynamic coupling effects initiated by muscle torques. The book has deepened my understanding of how to quantify contributions from non-adjacent segments and velocity-dependent torques in baseball pitching.

**b. Finding Stillness at 95 MPH by Shawn Green**  
This book provided a unique insight into the mindset of a hitter while offering a broader lesson on mindfulness and appreciating small moments in life. Shawn Green shares his journey through the majors and how repetition, from hitting off a tee to live BP sessions, enabled him to achieve peace of mind. The book emphasizes how such peace ultimately helped him find happiness and fulfillment, which is a principle I've incorporated into my daily routine and athletic mindset.

**c. The Holy Bible (KJV)**  
Since January, I have been on a journey to read the Bible from cover to cover as a new Christian. The most impactful books so far have been Numbers and Leviticus. Leviticus outlines how to live a life in alignment with God, emphasizing grace, repentance, and the importance of good works as expressions of faith. These teachings have greatly influenced my approach to both personal and professional interactions, as they emphasize humility, obedience, and purpose.

1. **What is one area of growth for you over the next 12 months, and what plans have you made to address that area?**  
   I aim to improve my management and leadership skills. As the Assistant Lab Manager at the PLNU Biomechanics Lab, I am currently responsible for helping my cohort complete their projects while training the incoming cohort. This position has provided me with the opportunity to develop leadership skills, and I plan to build on this foundation by taking on more responsibilities in managing projects and improving my mentorship skills.
2. **What is one area that you think Driveline Baseball is not investigating that you think is a huge mistake? How can you help us look into that field of research?**  
   An area worth exploring is induced power in pitching. Conducting an induced power analysis could shed light on the contributions from non-adjacent and velocity-dependent segments, helping pitchers achieve more effortless velocity. Additionally, investigating energy flow could help identify leaks from segment to segment. Comparing these models using markerless data could clarify the inherent biases in markerless systems when analyzing these variables. If induced power could be measured accurately using markerless motion capture, it would enable us to design intervention studies to assess the effectiveness of drills in enhancing velocity. This research could validate specific training methods, such as waterbags, core velocity belts, or plyoball drills, by determining whether they genuinely induce effortless velocity.  
   I would also explore arm and bat path metrics. Tracking the arm spiral could reveal inefficiencies in arm paths by modeling marker traces from the shoulder and hand markers. Similarly, bat tracking could be analyzed by transforming (x, y, z) data into polar coordinates, allowing us to examine bat planes as a single-dimensional variable for easier interpretation.
3. **What project have you worked on that you're most proud of?**  
   The project I am most proud of involves using the OBP system to extract C3D files into Excel with all markered data. After developing a C3D-to-Excel pipeline in Python, I constructed coordinate systems for every body segment as a function of time. From there, I used inverse dynamics to determine joint angles by calculating Euler angles between adjacent joints. This project aimed to define hip-shoulder separation using time-series data and linear algebra. My goal was to make Visual 3D tools open source in Python, enabling users to compute hip-shoulder separation using only markered data and basic linear algebra.

Another significant project was my physics capstone, where I modeled hip-shoulder separation as a spring torsion oscillator. This involved modeling hip-shoulder acceleration and deceleration as a second-order differential equation for a damped harmonic oscillator. Although the model was incomplete, I found that pitchers with higher velocities exhibited greater damping values, underscoring the importance of deceleration in the hip-shoulder sequence.

1. **Supporting Documents:**

All supporting documents are provided in the submissions zip folder called Driveline Documents.

1. **Why do you want to work at Driveline Baseball, and what do you hope to get out of the internship when it’s all said and done?**  
   Driveline offers the unique opportunity to apply my academic experience to an industry that is rapidly advancing. While academia provides a solid foundation for research, I find it often lags behind industry in terms of innovation and application. Working at Driveline would allow me to take my ideas and apply them in a fast-paced, research-driven environment that is committed to improving athlete performance. I hope to continue working with Driveline as a biomechanist or sports scientist, using this internship as a launching pad for a long-term career in baseball biomechanics.
2. **What is the toughest problem you've had to solve in the field of mathematics, physics, engineering, computer science, or biomechanics? Did you solve it? If so, how? If not, what was the limiting factor, and what did you learn?**  
   The toughest problem I've encountered was manually determining hip-shoulder separation for each frame in a motion capture sequence. My goal was to make Visual 3D tools open-source in Python by extracting markered data into time-series format, constructing inertial tensors for each body segment, and calculating joint angles using Euler angles. The complexity of working with 3D tensors in Python made it particularly challenging, as I had to reformat tensors for matrix multiplication to make sense. This required combining skills in linear algebra, Python, biomechanics, and physics. Although I haven’t fully solved the problem, I’ve gained valuable insights into tensor flow and biomechanics, which will aid future work in modeling upper extremity kinetics and kinematics.
3. **How much experience do you have with relational databases, like MariaDB / MySQL / PostgreSQL? What are some projects where you've interacted with these technologies? Have you had to manage a database server or just interact with it as a client?**  
   At Point Loma, we are in the process of building a database, using SQL via Python to query and append data. Although the database is still in its early stages, I am proficient in Python and have some experience with SQL. Our next step is to integrate key performance indicators (KPIs) into the database.
4. **Which location(s) can you work at?**  
   Arizona is preferred, but I am open to both locations.
5. **What would your earliest on-site start date be?**  
   I can start as early as January 1st, 2024, after completing my master’s degree. However, I am open to starting earlier depending on the circumstances.