



# STRUCTURAL ENGINEERS ASSOCIATION OF ARIZONA NEWSLETTER

[www.seaoa.org](http://www.seaoa.org)

OCTOBER - DECEMBER 2023

## State President's Message

David Grapsas, PE, SE  
SEAOA State President



Is it too early to say fall is here? It seems as though the stores set up the fall décor earlier and earlier every year. Or is it the pumpkin flavors that signal fall is here? I hope everyone enjoyed their summer. Our new year of SEAOA is officially underway. Please be on the lookout for event invitations, including the monthly Tucson and Phoenix Chapter meetings. The SEAOA website also has a calendar of events to keep you updated.

The SEAOA is a volunteer organization that relies on membership to maintain and improve itself. There are several committees; you can find more information at [www.seaoa.org](http://www.seaoa.org). The chapters encourage members to volunteer, so reach out to any of the committees to see how you can sign up to help.

Please contact [info@SEAOA.org](mailto:info@SEAOA.org) if you have any suggestions or would like to join one of our great Chapters or Committees.

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### TUCSON CHAPTER MEETING

**October 18, 2023**  
*More info to be posted to the SEAOA website*



### CONTACT US

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### CENTRAL CHAPTER MEETING

**October 17, 2023**  
*More info to be posted to the SEAOA website*

## Tucson Chapter President's Message

Janelle Perry, PE, S.E.  
Tucson Chapter President



I want to thank David Gluck with Grenier for volunteering as our Board Secretary and Jennifer Patroski as Director. It takes extra time and commitment to help out, but it is so important for any organization to have fresh perspectives and ideas. I really appreciate their involvement. We are still looking for a Treasurer, which can be an intimidating

position to fill, but we have Manuel Naves, the previous treasurer and current vice president to support and guide the new one. PLEASE consider taking on this vital role. Please email me at [janelle@jpstructural.com](mailto:janelle@jpstructural.com) as soon as possible.

The board is committed to bringing interesting and useful meeting topics to our membership and providing

## YMG President's Message

Cesar Castro E.I.T.  
Younger Member Group President



I want to introduce you to the Young Member Group (YMG) of the Structural Engineers Association of Arizona (SEAOA). The purpose of SEAOA YMG is to guide and support engineers in their transition between school and industrial practice while developing a structural profession. SEAOA YMG is

geared toward young P.E.s, E.I.T.s, and Structural Engineering students who practice or have interests in the structural industry. The main goals of this group are to:

- Alleviate the learning curve for the young engineers with provided seminars, workshops, and construction site visits.
- Build a network among young engineers to exchange technical information and to share lessons learned from their careers.
- Help the young engineers to develop leadership and management skills through a career enhancement program.

student scholarships for the future of our profession. There are so many high-achieving students at the U of A and we would like to increase the amount(s) we can give. I now have a couple of college students of my own, and the cost is surprising. We plan to have a bowling tournament as a fundraising event to support this effort later in the year. Please be on the lookout for more information on how you and your company can get involved.

On a sad note, we lost longtime member George Stevenson to cancer on August 25th. George Stevenson made an important impact on our organization and profession during his life. He had a passion for structural engineering and always stood up for what he believed was correct. He served as the Code Committee Chairperson for many years and looked to protect and enrich our profession at every turn. He had a fantastic sense of humor, and I always relied on him for guidance and mentorship. I am honored to have known him and hope his example of service will lead us all in our professional lives.

SEAOA YMG provides a platform for young engineers to exchange and share structural information, network in a community environment, enhance structural knowledge through design seminars and construction site-visits, and develop leadership and management skills by being a part of the SEAOA YMG. Members will be exposed to in-depth structural methodologies, the latest technologies and applications, and presentations on lessons learned from past or ongoing projects in the industry. We aim to shape our members into more valuable structural engineers and to further educate them to grow and advance in their careers. We invite all E.I.T.s and P.E.s to join and to become actively involved in this group. Our next meeting will be held on Thursday, November 2nd, at 6:00 pm at Meyer Borgman Johnson (116 E University Dr #500, Tempe, AZ). Please contact us at [seaoazygm@gmail.com](mailto:seaoazygm@gmail.com) to RSVP or to e-mail questions, comments, or suggestions.

We look forward to hearing from you and meeting you at our future meetings and events.

## In Memoriam, George Stevenson, Jr.

Sarah Betts, PE, S.E.



The Structural Engineering community lost a great engineer, mentor, and supporter of the profession, George Stevenson. George lost his longtime battle with cancer on August 25, 2023. George was born on March 26, 1953, in El Paso, New Mexico. The family settled in Tucson

when his father retired from the service after living throughout the United States. George met his wife, Judy, and worked for his father-in-law in his construction business for seven years doing masonry, framing, and concrete work. George returned to school and earned his bachelor's in Civil Engineering at the University of Arizona in 1988.

He worked for BKS Engineers, where he met Dan Lundwall. Together, they founded Structural Concepts, Inc. in 1991. George's unique blend of construction experience and engineering expertise provided innovative yet practical structural designs. Over the years, George and Dan, along with the Structural Concepts team, provided structural

engineering design for a wide variety of municipal, industrial,

forensic studies, commercial, and bridge projects throughout Arizona.

His favorite pastimes were camping, fishing, hunting, and spending time with Judy, his son Jake, and many family and friends. He was often known to lend a helping hand without hesitation, always going the extra mile to care for those with a need. Even in the last months of his life, he focused on how he could help his friends and family.

George served the Structural Engineers Association of Arizona as State President and the Code Committee Co-Chair for many years. He also served on the Arizona State Department of Professional Registration Enforcement Division and received a U of A alumni award for professional excellence. He was passionate about structural engineering, serving our association, and community involvement. He was generous in his time, wisdom, and expertise. Many structural engineers, young and old, benefited from his mentorship, friendship, and guidance. Many of us will remember his positive attitude, sense of humor, and great, booming laugh. He was a friend to so many and will be greatly missed.

### Need a Structural Engineer?

The SEAoA created a web page for members to add their name to a list of structural engineers who are available to consult on small residential and commercial projects. This list is very helpful for building safety staff in all jurisdictions. When an applicant receives a plan review comment requiring engineering for something like a new lintel in an existing wall, the first question the applicant asks is, "Can you tell me who to use?". Plan review staff are not allowed to make these referrals for several reasons. They can however refer to the website.

Please contact Sarah Betts ([info@seaoa.org](mailto:info@seaoa.org)) if you are interested in adding your name to this list.

## UA Civil & Architectural Engineering Career Night – Thursday, October 12<sup>th</sup>, 2023 (5pm to 8pm)

<https://www.uofaasce.com/fall-career-night.html>

Student Contact: Ryan Knoner, [knoner@arizona.edu](mailto:knoner@arizona.edu)

This event serves to pair civil, architectural, and construction engineering students with firms for internships and full-time employment. The Civil & Architectural Engineering Career Night begins at 5 pm in the Civil Engineering building courtyard for a one-hour reception mixer with industry representatives, students, and faculty. Following the mixer, the career fair takes place in historic Bear Down Gym from 6:00 to 8:00 pm. Food and refreshments will be provided. The U of A graduates many students who are highly sought after by multiple firms. This is a great opportunity to meet and talk with these students early in the school year because many of them will accept employment offers prior to their graduation.



### Request for Newsletter Articles

The SEAOA Newsletter Committee always appreciates input from the membership about articles and information that you'd like to see in upcoming newsletters. The newsletter is an excellent place for the SEAOA membership to share opinions, ideas and information with the rest of the association.

Here are some ways you can contribute to the SEAOA Newsletter:

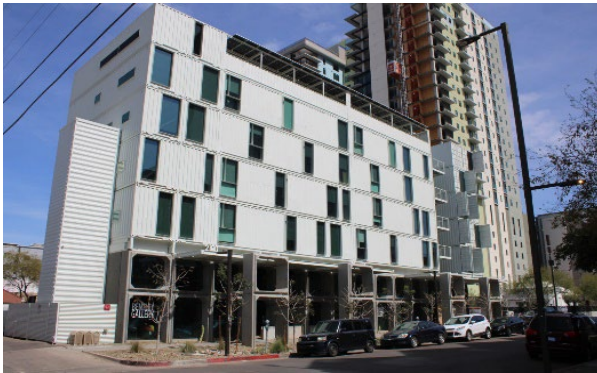
- Submit a nomination of a fellow SEAOA member to be featured in our upcoming **Member Highlights** section
- Provide a short article on a **recent interesting design project** that you participated in
- Provide a short article on **engineering community outreach activities** that your company has participated in

Also, anyone who could volunteer a little time every quarter to help publish the newsletter is most welcome. One easy way to help would be to “proof” the newsletter before it’s published. Please contact Sal Caccavale ([seccbc@cox.net](mailto:seccbc@cox.net)) or Mark Sipes ([Mark.Sipes@maricopa.gov](mailto:Mark.Sipes@maricopa.gov)) if you have any articles that you'd like to submit, if there are any topics you'd like to see in future SEAOA Newsletters or if you'd like to help with publishing the newsletter.



## 2023 SEAOA Merit Award in Structural Engineering Winner: Schneider Structural Engineers *New Buildings, \$2M - \$10M: IDA on McKinley, Phoenix, AZ*

Ron Schneider, PE, SE  
Project Manager, Schneider Structural Engineers



*IDA on McKinley – Open to the Public*

Open to the public as of June 2022, IDA on McKinley is currently the tallest steel shipping container building North America. The brainchild of Local Studio Design + Build, located in Phoenix, to combat the housing shortage as well as sustainability concerns apparent in the greater Phoenix area, IDA on McKinley is the fifth container project Local Studio has brought to life. Located at the corner of 3<sup>rd</sup> Avenue and McKinley, on a plot of land previously housing 22 parking spaces, this new multi-family housing venture boasts 18 living units and a 2,400 square foot ground floor for commercial business space. Though not included in the structural design, this project is notable for its commitment to sustainability in the form of many surprising design elements, such as enveloping the rooftop party deck with solar panels in order to reduce the utility bill for residents, communal outdoor showers for those who bike to work, an electric bike charging station, refillable water stations, and a 3,000-gallon rainwater collection tank.



*Container Fitup Prior to Placement*

Site logistics, along with the seemingly still taboo idea of building a living structure out of repurposed shipping containers, were some of the interesting challenges inherent to this project.



*Setting Containers on the Culvert Structure*

Our design was centered on the first two floors and the foundation. The shipping containers were engineered by Runkle Consulting and required substantial coordination between Schneider Structural Engineers (SSE), as the engineer of record, and the rest of the design team. Building loads from the container structures were provided and SSE designed the portion of the building to carry it down to the foundation. A total of 66 40-foot recycled shipping containers were used to create this building design.



*Glass Installation – Commercial Space*

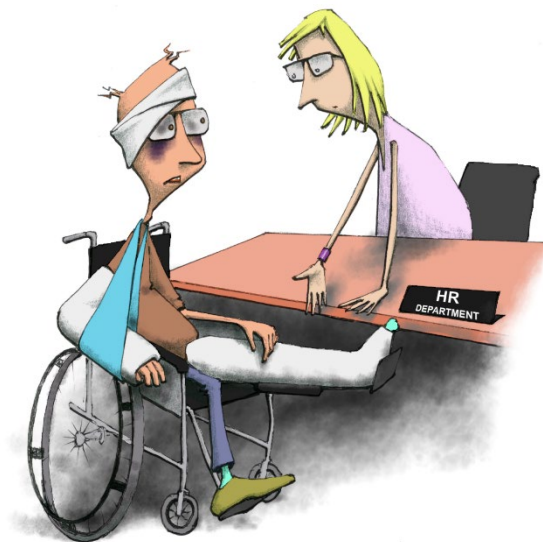
The containers are supported on a podium constructed with concrete over a composite steel deck supported by composite wide flange steel beams. The steel beams are supported on custom cast concrete culverts

that are stacked two high. The culverts are physically bolted and welded together and are supported on conventional spread footings. The elevator core was also precast concrete culverts stacked vertically. The lateral system is the walls of the containers down to the podium and precast concrete walls laterally brace the podium. At the upper levels, we created a two-level container with a loft space where half of the top and the floor of the shipping containers was removed to create a two-story space.

From a code perspective, we completed our design under the 2018 International Building Code (IBC) which had not yet incorporated guidelines for design with standard shipping containers. Runkle Consulting provided us with a Finite Element Model (FEM) of the containers that checked the load paths and lateral load-resisting system. The FEM also provided us with the reactions to design the podium. Because of this, the City of Phoenix requested that we present our design as if the containers were stick built, where SSE specified all the components. This required us to engineer each component of the containers as well as the required reinforcement of the containers outside of the FEM. Essentially, we reverse engineered the entire container and added the required modifications to the container to comply with City requirements. These modifications often required strengthening. This strengthening was mainly for gravity loads. The required reinforcement generated by our "stick frame" analysis had a strong correlation to the requirements for strengthening predicted by the FEM analysis. As the design progressed, we would simply supplement the calculations done outside of the FEM.



*Open Structural Walkways for Water Collection*



...AND THEN THE CONTRACTOR SAID,  
"CORRECT ME IF I'M WRONG"  
AND I COULDN'T RESIST!

*Add this one to the list of jobsite safety hazards.*

*This Right Brain cartoon is a contribution from Brent Wright of Wright Engineers, an SEAOA supporting firm. If you would like to contribute an original cartoon, please email it to [info@seaoa.org](mailto:info@seaoa.org)*



## 2023 SEAOA Excellence in Structural Engineering Winner: Gannett Flemming

### *New Buildings, > \$10M: Phoenix Sky Harbor International Airport Sky Train Rental Car Station, Phoenix, AZ*

Stephanie Templeton, PE,  
Shane Sweeten, PE, SE  
Aaron Krebs, PE, SE  
Robert Stanley, PE, SE

A two-mile extension of the trailblazing PHX Sky Train® has connected 14 million travelers annually to the Phoenix Sky Harbor International Airport's consolidated Rental Car Center (RCC) and new Ground Transportation Center. The project has reduced traffic congestion and alleviated wait times for shuttle bus service between terminals and the RCC, which previously topped 30 minutes during peak travel periods, where the RCC serves 34,000 people daily. PHX Sky Train® relieves traffic congestion and reduces the airport's daily vehicle count by 20,000, which reduces greenhouse gas emissions by nearly 6,000 tons annually.

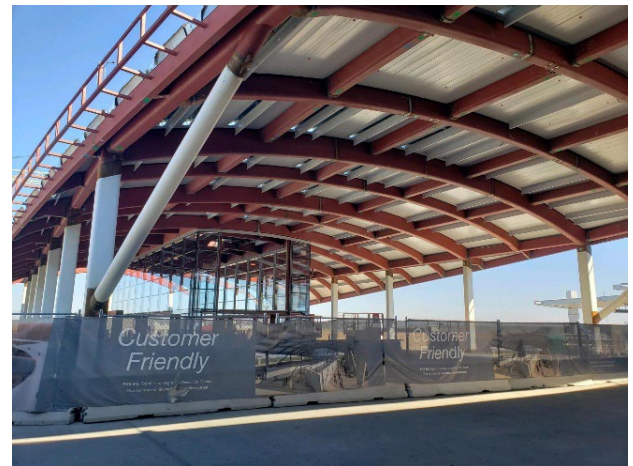
Gannett Fleming was the fixed-facilities designer of record for PHX Sky Train® Stage 2, providing guideway and support structure design from concept to completion. The Stage 2 guideway serves two new stations and a future station, including the Rental Car Center (RCC) Station, which is built in coordination with the upper level of the existing structure.



The project used a CM-at-Risk (CMAR) model to support fast-track delivery, enabling early identification and mitigation of constructability issues and allowing for overlapping design and construction processes. The project earned an Envision® Gold Award for

sustainability in 2020 from the Institute for Sustainable Infrastructure (ISI), ISI Envision Awards, which was the airport's first Envision award and the third Envision® - awarded project in the State of Arizona.

The RCC Station was chosen to have a higher architectural appearance than other stations. A decorative light wall was installed where the new guideway enters the station. New construction includes elevators, stair cores, and the new interface between the guideway and the station. The most dramatic feature is the high barrel roof that cantilevers from the station to meet the RCC's curb canopy.



The steel frame barrel-canopy superstructure over the RCC station utilized custom multi-directional curved HSS roof members. The connection design was performed as part of a design assist with the CMAR contractor, Hensel Phelps, and the steel fabricator, Able Steel. Due to the dramatic shape of the roof, deflection controlled the design. The new roof cantilevers over the existing plaza level to within 6 inches of the RCC canopy.

To allow for ductwork and conduits to run from the existing RCC to the new RCC station, the concrete

moment frame was composed of a 110'-0" long mildly reinforced concrete girders (8'-0" W x 10'-0" D) that clear spanned between two 6'-0" diameter concrete columns.



Due to the size of the concrete girder and the need for the girder to be placed monolithically, mass concrete techniques were utilized to aid in the proper construction of the concrete beam and alleviate the heat of hydration concerns. This approach included wrapping the girder with blankets to maintain consistent temperature throughout the beam during curing. Micropiles and concrete pier caps were utilized to support the nearly 110'-0" long concrete moment frame because of the frame's proximity to an existing MSE wall and the existing RCC. The proximity of the new concrete piers to an existing MSE wall meant that the MSE wall had to be monitored during drilling activities to ensure that no damage was done.

The design and construction of the original RCC included provisions for a future Sky Train® Station. Part of the plaza slab was depressed to accommodate the new station. Some assumptions were made regarding the future station but did not completely match the new proposed design. This disparity required several tasks be accomplished to strengthen the existing structure and ultimately support the new station design. This included the installation of new column anchor rods, strengthening the existing columns and beams, and modifying the existing slab for architectural features.

Installing new anchor rods for the new steel barrel roof was challenging. The rods supported a superstructure of steel moment frame. The existing concrete was post-tension (PT) concrete beams, making a challenging anchorage point. The final solution was to use 3D ground penetrating radar to map the location of the existing reinforcing and PT tendons. From this, we mapped out acceptable locations to install the anchor rods.



Once locations had been established, we checked the forces against the anchor rod configuration available. The contractor installed all new anchor rods without cutting any existing reinforcing or PT tendons. Carbon fiber was also used to reinforce and provide confinement to existing RCC concrete columns and beams.



## 2023 SEAOA Merit Award in Structural Engineering Winner: DLR Group

*New Buildings, > \$10M: Pinal County Attorney's Office, Florence, AZ*

Thomas Kramer, PE, SE

The design for the new 56,000 SF Pinal County Attorney's Office was derived from natural forces. Using lessons learned from the saguaro cactus, exterior metal fins provide structural stability and self-shading, breaking sunlight into small areas that shift continuously to prevent overheating. This intentional efficiency can be seen throughout the structural design.



Inspired by the beauty of the natural world, the result is a resilient and creative design that learns from the strategies found in nature to solve a human design challenge. The saguaro cactus thrives in the harsh desert climate due in part to its vertical fins, which provide continuous self-shading and heat redistribution. This continual self-shading prevents any one area of the cactus skin from overheating. On the office building, metal fins were carefully placed to shade the windows while maintaining the look of a continuous skin. Structural engineers worked closely with architects and high-performance designers to design the steel-framed fin structure. Fins were intentionally and creatively located to ensure efficiency goals could be achieved while meeting aesthetic needs.

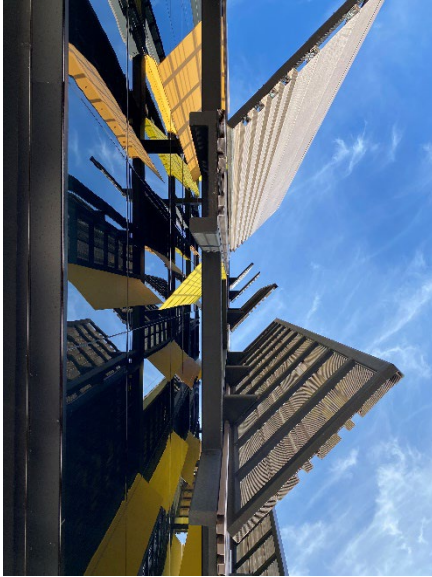
While the superstructure followed a modular repetitive grid, the variability of the exterior fins created a complex and unique challenge. The design goal was to have the fins extend from the exterior wall adjacent to window openings, creating shade during the hottest portion of the day. Locating the fin adjacent to windows meant limiting the locations of structural supports and risking obstructing the views from inside. The solution

was to cantilever the metal-panel-clad HSS framed fins from two HSS jamb posts in-plane with the exterior wall's cold-formed metal framing. On the west side, the jambs were attached to a frame that floats in front of exterior glazing. Cantilevering the fins from the jamb steel hidden in the exterior walls, the desired shading and cooling effects were achieved while protecting the views and aesthetic.



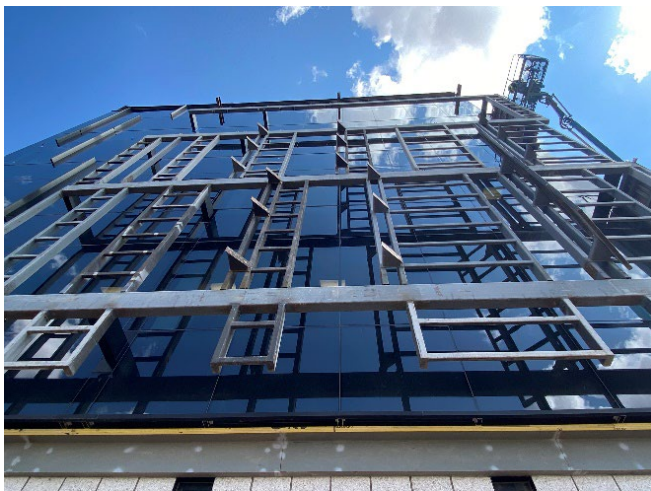
Several materials and configurations were analyzed using a finite element analysis program, comparing different design parameters such as material compatibility, redundancy in support, and torsional resistance. The fins range from 14-to-19 feet tall and protrude from the building three-to-four feet. The engineers aimed to limit vertical and horizontal deformations to avoid resonance and fluttering of the fins. This was accomplished using elevated wind gust loads and multiple directional load combinations.

*(article continued on next page)*



For such a dynamic design and exterior façade, the ingenious structural design provided consistent detailing for all the metal fins. The fins connect to structural steel jambs hidden within the exterior wall assembly, providing a graceful result as the fins appear to float from the exterior walls. Even though the fins alternate directions and orientations, a modular prefabricated inspired design allowed the contractor to erect the system in the field quickly. Because the fins and jambs were fabricated separately, the jambs could be constructed at the same time as the exterior wall assembly and fins attached once the façade assembly was complete. The streamlined erection process allowed for better efficiency and quality control. The choice of structural steel framing for the entire system was intentional. Single materiality improved coordination, eased construction, and ensured single-source responsibility.

To support DLR Group's pledge to the SE 2050 Commitment, a life cycle analysis and comprehensive embodied carbon reporting was performed on this project. Analyzing this data will help to establish a baseline that can be used to reduce embodied carbon in future projects.





### Meet Haley Prey

Academic Year 2023-24

Dear Structural Engineers Association of Arizona,

My name is Haley Prey, and I am so grateful for being selected as the recipient of the 2023-2024 Structural Engineers Association of Arizona Scholarship. This scholarship will enable me to continue pursuing my Civil Engineering degree at Arizona State University.

This semester, I had the opportunity to dive into more of my core classes, and I could not be more excited about the career I have picked. My passion for civil engineering continues to grow as I learn how to design and construct buildings that once captured my attention as a child. This year, I had the opportunity to take part in a traffic engineering internship. I loved being a part of projects that I knew would help people one day such as assisting with the analysis of schools, hospitals, and residential homes. I am thrilled to continue making an impact this summer through my structural engineering internship!

It is hard to put my gratitude into words as your generosity leaves me speechless. I want you to know I do my best every day to always have an open-mind and learn from all the intelligent people that surround me at school and at my internship. I plan to join ASCE next semester, and I am thrilled to have a higher level of involvement than I originally planned with the help you have provided. I would love to thank you personally at the Donors Breakfast or feel free to email me as well! Once again, your support greatly helps me, and I strive to make you proud through all my future endeavors.

Sincerely,

Haley Prey

#### What is your favorite class?

This semester, I took *Structural Analysis* (CEE 321) at ASU and although the class was difficult, I enjoyed the content! Our final project consisted of designing the frames for a 6-story building and this hands-on experience helped me learn a great deal about the job of structural engineers. Sadly, our group produced an infeasible design because of a miscalculation, but from our failure, I learned so much about the design process!

#### What's your favorite book?

My favorite book is called *Legend* which is different from the zombie movie with Will Smith. In this dystopia, every kid takes a test at a certain age and their performance on the test determines their status in the community. One kid receives a very low score, but he goes on to be a hero for the people and causes the community to reform. I love this book because the boy does not let the test define himself as he tries to create a better life for the people he loves.

#### What's your background?

I grew up in Peoria, Arizona with my two brothers and my sister, so I am used to the Arizona heat! I played many different sports at a young age which led to my passion for fitness. I ran cross country, played soccer, and competed in track throughout high school. I continue to play recreational sports here at ASU. During my free time, I enjoy learning Spanish and baking new things!