



TEXAS A&M UNIVERSITY  
Construction Science



# 2020

## CONSTRUCTION INDUSTRY ADVISORY COUNCIL

*Biennial Report*





**Why Are We Here? For Our Students!**





TEXAS A&M UNIVERSITY

## Construction Science

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COVER PHOTO:  
COSC students at  
Hard Hat Ceremony.



Howdy Aggie Constructors and Supporters,

As the adage goes, “if it ain’t broke, don’t fix it.” That is how I felt when I assumed the role of president of the Construction Industry Advisory Council two years ago. The legacy of past CIAC presidents, department heads, faculty, and members cast a long, successful shadow over the history of this outstanding organization. Since CIAC’s inception over 20 years ago, we have all benefited from its committed members who have been loyal to our program and enthusiastic about fostering a relationship between the industry and the department. With that backdrop, it has been an honor to serve as CIAC president for the last two years. CIAC is the finest and largest advisory board in the construction industry. We are revered as a model to follow by other universities across the country.

Over the past two years, we have accomplished many things, including:

- Membership - We have experienced the largest two-year membership expansion and broadest industry diversification in our history. At over 230-member companies from many diverse sectors of the industry, CIAC has never been stronger.
- Awards and Research Grants - Procedures have been developed and implemented for the selection of the Constructor Hall of Fame Award and for our research grant recipients. These procedures establish a sustainable roadmap to select recipients of this prestigious award and our research grant funds.



“With our rich history, nationally recognized leadership and faculty, envied industry support, and most importantly, first-class students, the construction science programs at Texas A&M are well positioned for continued success. I am blessed to be a former construction science student helping to shape the department’s future through CIAC.” JEREMY W. STOVALL '99

- Development - The Maroon Envelope was developed and became the first, formal initiative allowing the department to engage donors by explaining how tax-deductible contributions benefit our program through scholarships, capital improvements, faculty support and student activities. This initiative undoubtedly played a significant role in the establishment of 24 CIAC-matched endowed scholarships over the two-year period — the most in CIAC history.
- Graduate Programs – Our members collaborated with the department to add a non-thesis option for the Master of Science program and submitted an application for a Texas A&M Construction Management Ph.D. program.
- Aggie BUILD – For the fourth consecutive year, CIAC invested significant financial support of Aggie BUILD, a student-led service organization that builds and sends out portable medical clinics around the world in honor of those lives lost in the collapse of the Aggie Bonfire.

I would be remiss to fail to express how grateful I am to have served alongside Dr. Patrick Suermann and Hernan Guerra during their inaugural years with our department. Both lead with excellence and have advanced our program immensely.

While celebrating the accomplishments of the past, we look expectantly forward as CIAC is poised to even greater success ahead. Under the leadership of incoming president Matt Summerville, and the existing executive team, CIAC's best days are ahead. Thank you again for the opportunity to serve you all. Together, we represent Aggie constructors past, present and future!

Gig 'em,  
Jeremy W. Stovall '99  
*CIAC President 2018-2019*



Howdy CIAC members and fellow Aggies,

Leadership means leveraging all resources to effectively realize a vision. I stand on the shoulders of the giants before me, namely Jim Smith and Joe Horlen, who established ambitious visions and achieved outstanding accomplishments that have made our department the largest and best in the country.

As we experience the very best in transformative education, innovative research and impactful service here in the Department of Construction Science in the College of Architecture at Texas A&M University, there are three overarching categorical imperatives — teaching, research, and service — from our university president, Mr. Michael K. Young. Our primary job is to educate students and ensure they demonstrate proficiency and mastery of our student learning outcomes so that they can become preeminent construction leaders for Texas, the nation, and the world economy. In this way, we promote our university and department brands through graduating not only the most construction science students in the country, but also the best.

Similarly, our service and industry relationships are crucial as we all seek continuous improvement in the construction industry at a pivotal time in our profession's future. As I round out the latter half of my first term as your department head, it continues to be an honor to lead the very best group of faculty and staff at Texas A&M.

Our world class faculty are teaching the world's best students in the nation's largest program. Our students benefit from many decades of combined experience from our faculty's previous work in construction and education. Rather than just saying we are the best, we have a reinvigorated call to action to ensure students prove this to themselves through multiple regional and national construction competitions as well as study abroad program opportunities.

Our goal is not to just to claim we have the best program, but also to prove it.

In the last two years, we have grown from attending five regional and national student competitions per year to nine. We have also emphasized the opportunity and value of attending Constructionarium, a uniquely prestigious student leadership experience in the United Kingdom. Here, students undergo realistic role-playing exercises as they lead, manage, and build a real-world construction project. It is wildly successful.

Our students have earned multiple awards in project management, construction ethics and heavy civil competitions and been finalists in mechanical, residential and roofing competitions. This would not be possible without the leadership of our great faculty, the support from our friends in industry, our hard-working staff, and our students' many hours of dedication to the Aggie core value of excellence.

Our research faculty are the strongest they've ever been. With an established tradition of excellence and several strategic hires, our research expenditures tracked by the college jumped from 3% to 26% of the college's research from 2017 to 2019. Moreover, we increased our productivity tenfold in this short time. We have the most federal grants

of any construction program in the country and our diverse group of researchers show promise for tackling the hard hitting, applied problems for disrupting and improving our industry.

We are still growing and seek research partnerships with government entities, private donors and industry partners. It is our industry partners who have also supported our most recent effort to create our own Ph.D degree in construction. The application for our new Ph.D program was submitted in the fall of 2019; we were overwhelmed by support letters from 30 industry and university colleagues and friends who know that this Ph.D program will grow our ability to innovate and improve the global state of the natural, built and virtual environments.

Thanks to our industry relations office leadership and support from two new additions, professor Hernan Guerra and Mrs. Melissa Sodolak, and in conjunction with our CIAC partners, we have countless examples of service to our industry and our communities.

Student field trips are rotated among our CIAC partners, improving student knowledge and exposure. Trips are selected based on the diversity of CIAC companies, offering our students opportunities to attend commercial, development, residential, industrial, healthcare, heavy civil and other construction sites. The service provided by our staff, faculty, students and industry for the field trips make this one of our students' favorite events every semester.

Other banner days for our department are the scholarship awards banquet and the career fairs. These two events provide new beginnings for our students and scholarships to allow them to attend our prestigious program. Thanks to CIAC, our scholarships are now over a half-million dollars per year and we have over 185 companies attending the career fairs. The firms are the ultimate winners because they hire our fantastic students. Our young leaders also participate in many local community service activities. Specifically, COSC students are leaders of programs such as Aggie BUILD, Habitat for Humanity, COSC Service Day and the well-known Aggie Big Event.

While we can celebrate our mutual success together, we won't "break our arms patting ourselves on the back." It is our job to make sure our department remains the premier construction program in the nation and we will need to earn this title daily. As we embark on our new strategic plan and align with the university's new 2020-2025 vision, the future is ripe with opportunity. Our innovation, hard work and selfless service will require (and we will be grateful for) your support. Imagine where we can be, and help us achieve our calling to answer your vision. For all your support in these first two years of my tenure at Texas A&M, I personally thank you and I am grateful to be surrounded with the best team. Thank you, each and every one of you. Gig 'em,

Patrick Suermann, PE, PhD  
*Department Head and CIAC Executive Director*



"It's my incredible honor to be the servant leader of the largest and best department of construction higher education in the world as we look back on 50 years of our college and embark on a new decade with a vision forged by past Aggie leaders like former President Robert Gates. The future is bright for those who are willing to work hard enough to seize the opportunity."

PATRICK SUERMANN



# PROFS STUDYING HOW TO TRAIN WORKERS IN EXTREME ENVIRONMENTS



Manish Dixit



Ann McNamara



André Thomas



*Construction science prof Manish Dixit is leading a team of scholars developing principles for virtual reality training simulators for workers in deep space.*

**In the future**, as the projected limits of human exploration extend beyond the moon to Mars and even further destinations, some workplaces will be in deep space with low- and no-gravity environments. How can workers be trained for extreme environments like space, deserts or deep oceans in a safe, cost-effective manner?

A research team that includes three Texas A&M College of Architecture scholars is developing design principles for virtual reality training simulators for workers to flourish in these environments in a three-year, \$1.2 million study funded by the National Science Foundation.

“Our main goal is to understand how spatial cognitive processing differs in altered gravitational and visual environments, and how virtual reality-based simulation can help train workers to adapt to such environments,” said Manish Dixit, Texas A&M assistant professor of construction science and the study’s principal investigator.

The current approaches to train workers for operations in altered environments are expensive, insufficient, and risky, he said.

“To train workers for microgravity conditions, parabolic flights are used to experience a microgravity-like environment through free fall,” he said. “This is expensive and risky. Each flight has to perform multiple parabolic climbs and descents to achieve a few seconds of microgravity.”

Traditional scuba diving training methods are also risky, he said. “In 2014, nearly 1,220 emergency room visits due to scuba injuries were reported in the U. S. alone, resulting in 188 deaths.”

Dixit and Texas A&M visualization researchers Ann McNamara and André Thomas, will measure and analyze subjects’ eye movements, brain electrical activity, cognitive strategies and mental workload reaction time during behavioral tests in simulated normal and altered environments, then apply the results to create a framework for a training simulation or game.

“This study will create new knowledge in behavioral and physiological domains of cognitive science and lead to a better understanding of spatial cognitive processing in altered environments,” said Dixit. It will also lead, he said, to the invention, evaluation, and application of innovative methods and tools that use virtual reality, eye tracking and brain wave data to design scenario-based simulations and games for workforce training.

In the study, the College of Architecture researchers are also teamed with Joseph Orr and Jyotsna Vaid, faculty members of the Texas A&M Department of Psychological Brain Sciences, and Greg Chamitoff, a former astronaut and professor of aerospace engineering.

The study’s funding is from the Human Technology Frontier Program of the National Science Foundation’s Division of Computer and Network Systems.



## OBJECTIVES

The Construction Industry Advisory Council has maintained a commitment to the objectives contained in its by-laws and has been an integral part of the Department of Construction Science at Texas A&M University since its formation in January 1998.

The program of construction education at Texas A&M University maintains its top national ranking among the 72 four-year baccalaureate programs accredited by the American Council for Construction Education (ACCE) with the real-world experience that CIAC members provide to the Texas A&M program that advances all aspects of teaching, research and service.

During 2018-2019, the CIAC member companies enhanced the construction education program at Texas A&M by providing 95% of all professional internships and jobs for students. These high numbers of interns and jobs illustrate how CIAC members compete to hire Aggie Constructors by taking advantage of their booth at the fall and spring career fairs, hiring interns, and offering the intern a job prior to graduation.

The presence of council members on campus provides opportunities for active participation, cooperation and coordination between members, faculty and students that increased the quality of the classroom education and internships. Priority access to students is provided by CIAC member involvement as guest speakers, class sponsors, and as internship, field trip and scholarship providers throughout 2018-2019. CIAC member companies can participate in the "Company Day" by using registering online to schedule a date to meet

with students and visit classes throughout the day.

CIAC By-Law objectives include:

1. Promoting and improving the construction profession by education and development of the body of construction knowledge.
2. Advancing and supporting the highest quality faculty, educational facilities and undergraduate and graduate programs for the students enrolled in the Department of Construction Science.
3. Providing liaison between the construction industry and the Department of Construction Science.
4. Developing and implementing innovative programs benefitting the Department of Construction Science, its students and the construction industry.
5. Offering advice and counsel and providing vision for the Department of Construction Science through the active participation of the construction industry.

## GOVERNANCE

CIAC is governed by a set of by-laws that defines principles, policies and procedures that guide this organization made up of 231 business entities, 14 associate members, 51 lifetime individual members, seven emeritus members, and seven annual individual members with an annual budget of over \$500,000. The increase in the number of associate members was in response to the creation of a minor degree in management and participation by facility management focused trade and professional associations and organizations.

A copy of the by-laws is available on the Construction Science Department's web site

at: [cosc.arch.tamu.edu/industry](http://cosc.arch.tamu.edu/industry).

The majority of the CIAC's affairs and business are conducted through standing committees whose chairs are appointed from the council membership by the Executive Committee.

The president presents the slate of chairs of each committee for the next two calendar years at the fall meeting of each odd numbered year for council approval. The chairs serve for two years beginning January 1. The following standing committees are appointed:

**1. Budget:** The purpose of this committee is to prepare the proposed annual budget for consideration by the full membership. This committee also monitors expenditure of funds from the CIAC account to ensure that expenditures are in accordance with approved budgets.

**2. Graduate Program Curriculum, Research and Studies:** The purpose of this committee is to provide continuous review of the department's graduate curriculum and to foster changes where needed to promote continuous improvement, and to determine the priorities for spending CIAC funds on graduate program issues, research and studies to further the objectives of the CIAC.

**3. Membership:** The purpose of this committee is to promote and solicit CIAC membership, and to develop and manage a CIAC awards program providing appropriate recognition for students, faculty and CIAC individuals and corporations.

**4. Curriculum:** The purpose of this committee is to provide continuous review of the department's undergraduate

# MEMBERSHIP OPPORTUNITIES

curriculum, and to foster changes where needed to promote continuous improvement.

**5. Development:** The purpose of this committee is to support and promote the fund-raising activities of the Construction Science Department.

The Executive Committee of the CIAC may appoint task forces from time to time for special purposes with time limitations as set forth by the Executive Committee.

## MEMBERSHIP OPPORTUNITIES

CIAC By-Laws provide four categories of membership: business entity, emeritus, associate, and individual.

- Business Entity Members, are industry sponsors who pay annual dues of \$2,500. In turn, the companies are entitled to designate two representatives of the business entity to participate in the council's activities. Business entity members are listed on the last pages of this report.
- Emeritus Members are constructors who have distinguished themselves in some aspect of construction and whose expertise and participation are valuable assets to CIAC membership. This is a special category of membership that is approved by the Executive Committee to recognize these very experienced individuals. The member is invited and encouraged to participate in all council activities. Emeritus Members are not required to pay dues, and are non-voting members of the council. Emeritus Members are listed on page 103.
- Associate Members are representatives

of professional industry organizations (AGC, ABC, TCA, TEXO, ACCE, IFMA, CMAA, BOMA, and HCA of S.A) that are invited by the Executive Committee to be members of CIAC and participate in council events. Associate Members, in deference to their significant association contributions to the Department of Construction Science, are not required to pay dues, but may vote on CIAC issues. Associate Members are listed on page 105.

- Individual Members are construction industry representatives who desire to support the department and participate in CIAC activities and meetings. Although many are graduates of the Department of Construction Science, membership is open to non-graduates. There are two levels of Individual Membership: Annual and Lifetime. While all Individual Members are invited to participate in CIAC activities and meetings, only Lifetime Members may vote on CIAC matters. Individual Members are listed on page 103.

For additional membership information or to join, contact the Department of Construction Science at 979.862.7345 or by mail: Construction Science Department / Industry Relations Office – CIAC / 3137 TAMU / College Station, TX 77843-3137.

Web: [cosc.arch.tamu.edu/industry](http://cosc.arch.tamu.edu/industry)

The CIAC conducts its regular business meetings each fall and spring semester in College Station, Texas. An agenda for each business meeting is prepared with a full slate of events for the discussion of important funding, curriculum, development, membership and research issues. The Executive Committee, consisting

of the president, vice president, committee chairs, and executive director and past presidents, meets the day prior to the full membership meeting to review the agenda to ensure all important pending issues would be effectively addressed.

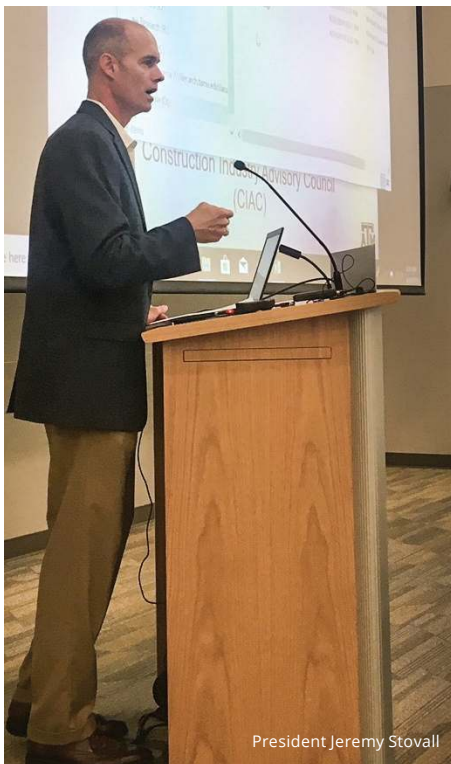
Summer informational meetings are held in Houston, Dallas, Austin, San Antonio and Harlingen to update members on the status of strategic plans, academic performance and key assessment factors.

Support to the CIAC membership is provided by the Industry Relations Office (IRO) located in the Construction Industry Advisory Council Industry Relations Suite, Room 216 in Francis Hall. The IRO was established in 2007 and is staffed with a faculty member who serves as the Industry Relations Coordinator, and an administrative staff member. Together, the IRO team provides responsive support to the CIAC members, conducts the career fair events, and manages the department's internship program. In addition, the IRO handles all industry related events such as tailgates, banquets, field trips, meetings, guest speakers, greeting prospective students and parents, and company days.

## EXECUTIVE SUMMARY

Agendas are provided to CIAC members prior to each meeting. The minutes for the executive committee and the full council meetings are recorded and distributed to the membership after each fall and spring semester meeting. The initial agenda item for each CIAC meeting is a department- and program-level issue that each separate committee addresses and provides industry insight and perspective on.

Copies of CIAC meeting minutes with more detailed information on the meetings can also be viewed at: [cosc.arch.tamu.edu/industry/meetings](http://cosc.arch.tamu.edu/industry/meetings)



President Jeremy Stovall

Summaries of the program and department issues that were addressed in the full council meetings during 2018–2019 are provided as follows.

**APRIL 2018** President Jeremy Stovall, Brookstone, opened the meeting by welcoming the 54 members present and recognizing new members attending their first CIAC meeting. He expressed joy about his first banquet as the incoming CIAC president for 2018-2019, and noted that 80% of the scholarships awarded were funded by CIAC members. He also expressed appreciation to Dave Fleming as outgoing CIAC president for his time and energy. Dawn Jourdan, executive associate dean of the Texas A&M College of Architecture, presented a state of the college update with the good news that the college is well-funded and that future funding levels are expected to remain stable with no significant changes. There should be no increase in student enrollment after recent years of 76% growth. The current college enrollment is 3,200, which presents a challenge since existing facilities have a 1,500-student capacity. The focus going forward is on interdisciplinary, workshop-based efforts between departments. The college's study abroad program is robust, but will be expanded with more international sites around the world.

Patrick Suermann noted the growth in the amount of scholarships awarded from \$16,000 in 1999 to over \$400,000 in 2018. After an update on the state of the department, he reviewed the meeting agenda, and spoke on the inclusion of a guest speaker from Autodesk as an initial step toward building a partnership

with the firm. He explained the purpose of a key performance indicator task assigned to the committees is to provide important benchmarks that will aid the department in advancing the program to exceed industry expectations. Suermann spoke on the findings of the October 2017 reaccreditation visit: six strengths and three minor weaknesses with no areas of concern. He highlighted the major achievements of faculty members and noted the department had provided a successful continuing education program for H.E.B. senior leaders and managers. The department is achieving increased levels of funded research that will be expanded further by the addition of an additional research-focused, tenured faculty member. He spoke on his observations of students participating in the Constructionarium in the U.K. over spring break and stated he would like to see a similar program available in the U.S., perhaps on the RELLIS campus. He said there is a high level of support and available space.

George Eustace provided an industry relations update and reported that the current CIAC membership was 177 with an expectation of reaching 200 by year's end. The lunch meal changes for the career fair were well received and will allow for growth to 180 available booth spaces. The scores for the weekly writing assignments for students on an internship show steady improvement. Each student was provided a job placement information package with data and graphs based upon the fall 2017 senior exit survey.

Charles Coppage, product specialist at Autodesk, presented state-of-the-art technology and projections on future advancements of interest to those in the





construction field. Their goal is to use greater amounts of data and move from reactive to proactive and, ultimately, predictive management of design and construction operations. He directed those in attendance towards Autodesk's "Red Shift" website that highlights Autodesk's programs.

**OCTOBER 2018** The meeting started at 8:32 a.m. with CIAC President Jeremy Stovall welcoming everyone. The message included appreciation for all CIAC members present; acknowledgment of the new location for the board meeting (RELLIS Campus Center for Infrastructure Renewal – CIR); praise for the great work performed by Bartlett Cocke General Contractors and five other CIAC companies who built the CIR building; and congratulations to Dr. Kathy Banks, dean of the College of Engineering and Dr. Jorge Vanegas, dean of the College of Architecture, for the prestigious honor of being the

newest members of the National Academy of Construction, which honors champions of construction science education. Stovall followed his opening remarks with the introduction of Banks.

Banks welcomed all CIAC members to the new building. She acknowledged the efforts made by her staff and Vanegas to host the meeting and mentioned that the College of Architecture's Department of Construction Science was already working on having some of their faculty members perform research in the building. Banks concluded her presentation by mentioning this new facility was for all Texas A&M and then introduced Vanegas.

Vanegas thanked Banks and spoke on the word "infrastructure." He spoke of the immediate need for updating the infrastructure in the country and how it is one of his priorities. He said he has been the dean for 11 years and that this is going to

be his last term. During his time, he said he has visited many other colleges, companies and programs and his biggest takeaway as a leader is on the importance of guiding the growth of the faculty and the college. He said both colleges can be very successful together.

Patrick Suermann, Department of Construction Science head, opened his remarks with an appreciation of joint efforts by the College of Architecture and the College of Engineering and appreciated and acknowledged the words said by both deans. Suermann gave an update of the department, focusing on the three main areas of teaching, research and service.

**TEACHING:** Suermann said two main downward directed initiatives caused a delay in major planning for COSC-specific courses in 2018, which was planned to be curriculum-focused. However, there are still short-, medium-, and long-term efforts underway. In the short term, COSC is excited to have a stable foundation of strong new and returning professors who are renewing the curriculum, such as Jonathan Houston, who conducted recent tours of the Texas A&M power plant. Similarly, in the short term, they are returning to 3 credit-hour capstone courses and taking the extra credit hour for the surveying course that was 2 credit hours. Also, in surveying, administration has added drones so all students will get stick time on DJI small, unmanned aerial systems. In the medium term, they are looking at ways to increase an online presence, such as the recent foray into online courses including Materials and Methods and soon-to-be-added COSC 375 and Estimating II. In the long term, department administrators will capitalize on

accreditation recommendations and look at more technology in the curriculum and ways to ensure students are serving the industry of the future. Lastly, the formation of TIGER or laser-focus teams will make courses of action for possible business line or position-focused tracks in the program easier to create.

**RESEARCH:** Suermann complimented Amir Behzadan for stepping up to accept his appointment as the COSC Research Coordinator. A special highlight was made for an Autodesk CIAC member, who spent a week with tens of faculty and hundreds of students in multiple classes thanks to John Herridge. Behzadan was commended for his superior speaker series and helping to communicate our nationally leading federal grants on the new and improved research web page.

**SERVICE:** Suermann ended his presentation with an explanation of the CIAC and COSC coins implemented in the fall of 2017. Students who perform excellent work, like Kaitlyn McCollum in social media strategic communications, and Emi Gonzalez for his work on the consulate in Matamoros, Mexico, were both awarded COSC coins for excellence. Lastly, Suermann told the firms that he is so proud to have the university's largest departmental career fair with 198 firms present between the two September career fairs. Suermann also reiterated that he never forgets who built Francis Hall or who funds our nearly \$500K in scholarships because he sees their names around the building on a daily basis and is extremely grateful.

Hernan Guerra introduced himself as the new industry relations coordinator and acknowledged the efforts and amazing

work performed by his predecessor, George Eustace. He continued by thanking Melissa Sodolak, IRO Administrative Assistant, for her excellent work to set up the venue and organize all details to hold the CIAC Fall 2018 board meeting. Guerra presented the industry relations statistics/numbers for COSC internship students and from the exit survey for all Spring 2018 graduating students.

Guerra spoke on his ideas for the future of the Industry Relations Office. He said there is still some room to expand CIAC



to maintain its goal of five students per company and that his main goals are in the following three areas: early engagement, company diversity and innovation.

Guerra concluded his presentation by informing all present on important CIAC dates for the next three years and thanking everyone in attendance.

Suermann introduced guest speaker Thomas Stipanowich. Stipanowich, who holds a Texas A&M Hagler Institute for Advanced Study fellowship, presented "Mind Games in Bargaining: Perceptions and Psychological Factors in Negotiating."

The 45-minute presentation concentrated on tools to become a better negotiator and communicator. He began by explaining levels of human programming such as personality, its own culture, and overall human culture. He explained how human brains work and can be manipulated through heuristics, which are mental shortcuts, and by selective perception. He used these tools to explain how decisions are made and often controlled by framing critical information. He included tools on how to negotiate more efficiently by creating perceptions of fairness and framing goals. Some perceptions include loss aversion, certainty effects, scarcity effects, and availability bias. He concluded with an exercise for the entire group where he anchored information on our brains creating a "magnetic pull" and explained how all these tools can be used to negotiate more effectively.

**APRIL 2019** Jeremy Stovall, CIAC president, started the meeting at 8:35 a.m. by welcoming everyone. He spoke on his appreciation for all members in attendance, Patrick Suermann's ongoing



work as department head, and invited all new attendees (around 25) to introduce themselves. He said over 230 scholarships were offered to COSC students totaling over \$450,000 for the year. He then introduced Dr. Jorge Vanegas, dean of the College of Architecture.

Vanegas expressed his love for construction, showed he was wearing a Texas A&M Construction Science shirt and said he cancelled a trip in order to attend the CIAC board meeting. Vanegas shared a story about how he became dean of the College of Architecture and how the department has grown since he first started. As dean, he has worked with three COSC department heads: Jim Smith, Joe Horlen and Suermann. He reminded everyone that the college turns 50 years old in 2019, and recognized that COSC is the largest department in the college. He



informed the board that due to ongoing growth, there are various plans for physical building expansion, including a renovation of Langford Building C, a possible new wing to Francis Hall and many more potential opportunities for the college and department to grow, including COA North in downtown Bryan. Vanegas spoke about future programs, including the upcoming COA undergraduate curriculum changes with the addition of first year experience, cultural discourse courses and meta majors. He also shared with the group how the college has become a research powerhouse in just a few years and that COSC faculty are now occupying the Center for Infrastructure Renewal building. He concluded his presentation by thanking CIAC for all they have done for the department and said that CIAC is the envy of all construction programs in the nation.



Anthony Marraro, associate department head, opened his remarks with an appreciation of everyone in attendance and gave updates on teaching, research and service benchmarks.

**TEACHING:** Marraro said Shelley Smith, undergraduate program coordinator, shared upcoming changes for curriculum enhancement which would allow students to have more elective choices and allow for a better list of courses. Marraro said the program is always looking for a culture of diversity in students and faculty.

**RESEARCH:** Marraro highlighted:

- External research funding by tenured and tenure track (T&TT faculty: ~\$1.3 million)
- 11 internal T3 grants by T&TT faculty totaling more than \$300K
- 13 publications in peer-reviewed scientific journals and 13 in the COSC Top 10



- Increased the number of Ph.D. students from 2-3 (a few years ago) to 18

**SERVICE:** Marraro highlighted:

- Aggie BUILD
- Community Volunteers
- Construction Career Academies

Marraro explained how CIAC has supported Aggie BUILD over the years and how the Construction Career Academies continue to be as successful in part due to the CIAC's effort and donations. Marraro introduced Hernan Guerra, industry relations coordinator.

Guerra expressed his appreciation for everyone in attendance, especially new CIAC members. He provided an update on two of the three vision items he spoke on during the Fall 2018 CIAC board meeting: company diversity and early engagement. He mentioned some of the initiatives regarding early engagement within construction science students and CIAC companies. Invitations were sent to all freshmen and sophomore students to attend the career fair and visit the Industry Relations Office prior to the fair. The goal was to create student excitement to pursue summer jobs with CIAC members. He said in the fall of 2018, 33% of all junior students seeking an internship had zero experience in the construction sector. While it may take a year or two to start seeing results, he was pleased by the large attendance of lower-level COSC students during the past career fair. Guerra continued to explain the rotation of the required field trips. In the past, field trips had been assigned to various locations which seldom changed. For the last two semesters, there has been a rotation of CIAC members, which allows



brand expansion. The rotation now includes CIAC companies but also their market sector, to make sure there are always opportunities for students in the construction field of their choice.

Guerra then presented Shelley Smith, undergraduate program coordinator, who gave an update on COSC's undergraduate curriculum changes.

Smith reported on three major student success initiatives created by the university and College of Architecture: the first-year experience, meta majors and a cultural discourse class.

The meeting concluded with Joe Horlen, former head of the Department of Construction Science, presenting a plaque to George Eustace, who retired in September 2019. Eustace gave a brief description of his life including three separate careers in construction, becoming industry relations coordinator at Texas A&M for over a decade and creating the strong office and partnerships which continue to stand now. His work will carry on.

**OCTOBER 2019** The meeting started at 8:35 a.m. with a welcoming message from

Mr. Jeremy Stovall, president of CIAC, for everyone in attendance. The message was divided into the following main ideas: welcoming anyone new to CIAC board meetings and the presentation of the overall agenda. When welcoming all the new representatives of CIAC companies attending the board meeting for the first time, Stovall asked each of them to introduce themselves and mention which company they represented. After the over 12 new attendees introduced themselves, Stovall thanked them for their attendance and proceeded with the overall review of the

agenda. Stovall mentioned that the meeting would take place in two adjacent venues: The George and Cavalry Court. He gave a full overview of the day's activities and concluded with CIAC's support of the change of venues for the board meetings. Stovall concluded his opening remarks at 8:44 a.m. with the introduction of Dr. Patrick Suermann, head of the Department of Construction Science.

Dr. Suermann opened his remarks with an appreciation of everyone in attendance. Dr. Suermann then welcomed Dr. Tulio Sulbaran, head of the

Department of Construction Science at the University of Texas at San Antonio, who was in attendance to learn about CIAC. Following the presentation of Dr. Sulbaran, and again thanking CIAC, Dr. Suermann then updated the board on the status of CIAC-matched, endowed scholarships. In 1999, before the CIAC matching scholarship program began, the Department of Construction Science had 14 total endowed scholarship endowments. Today there are 115. The large majority of those new scholarship endowments were created through CIAC's matching gift program.

The total, in permanent endowed funds donated and matched through CIAC matches, including scholarships and endowed professorships, is \$3,723,470. Of that, \$2,903,470 are endowed funds that will fund scholarships in perpetuity.

Suermann gave an overview of Texas A&M President Michael K. Young's vision for the university and mentioned how his presentation would be based on that vision. Suermann spoke on why the present matters and who we are. Suermann said the university has over 69,000 students, that the program grew recently for the first time in three years and is now close to 1,200 students, and that it is growing in quality.

Suermann said that in an article by the Wall Street Journal, Texas A&M is ranked No. 1 in return on investment and has the highest six-year graduation rates. Suermann mentioned there are some websites which rank construction universities that are misleading, as the department is an ACCE-accredited program, which does not allow ranking. Suermann said he believes Texas A&M's program is seen as the leader in construction science. He said that though we are believed to be the best, we need to continue to work on developing new ways to continue being the best. Suermann said the Department of Construction Science is working on a new strategic plan for the next 5-10 years. He said there will be future correspondence sent to all CIAC members requesting industry input for this new strategic plan. He presented a timeline for deliverables which include: pre-summit on January 3, 2020, summit on January 24, and a final plan submitted sometime between mid-March and May.

Suermann said what he believes the vision should be for the next 50 years. It includes community involvement, transformational education, discovery and innovation, and global impact. The department already has a huge

involvement in the community through Aggie BUILD, and COSC Student Organized Service day. Suermann used Constructionarium as an example of transformational education and how it is imperative that more students get involved in similar programs. He gave examples on innovation such as Professor Kenneth Williamson's drone work for surveying, and how all COSC students get experience as drone pilots. He concluded his 50-year vision of global impact by saying the department needs to continue to have firm diversity and international research partners.

Suermann gave undergraduate, graduate, faculty and research success indicators which he believes could certainly make our program the best in the nation if met. Suermann introduced Hernan Guerra, industry relations coordinator.

Guerra provided an update on company diversity and early engagement, two of the three vision items he spoke on during the Fall 2018 CIAC board meeting.

Guerra updated the board on the CIAC Construction Market Diversity goals set forth in 2018. He said CIAC stands at 230 companies and when compared to the department's 1,050 students, creates a ratio of

4.63 students to each company. That ratio is close to what the CIAC prefers at five students per company. The company list is CIAC's largest ever, and the priority now will be to continue to diversify types of CIAC companies. The commercial general contractors within CIAC now make up 45% of our total, the lowest it has ever been. He said CIAC is growing the right way by adding different types of construction companies, allowing our students to choose the right fit for them when they graduate.

Before proceeding with the exit survey information, Guerra gave an update on career fair numbers. The Fall 2019 Career Fair, with 183 companies, was the largest CIAC Career Fair ever held, growing from 175 the year before. Guerra informed CIAC members on the results of COSC exit survey data for internships and employment data from fall 2018, and concluded his presentation by mentioning important CIAC dates for the next three years. Guerra introduced Chuck Gremillion, director of Construction Career Collaborative (C3), who presented to CIAC what the C3 initiative is and its current status.





# COSCI STUDENT CREATES HIGH-TECH, 3D RENDERINGS OF FRANCIS HALL



John McDavid

**Richly detailed, immersive tours** of Francis Hall, the home of Texas A&M's Department of Construction Science, are now available to anyone with an Internet connection.

The virtual tours, created by undergraduate construction science major John McDavid V, are available in a series of renderings in which virtual visitors "enter" Francis Hall's advanced building information modeling facility and see rooms that house its' piping, controls and fittings, Segner

Auditorium as well as other areas.

McDavid created the renderings with a 3-D camera and software by Matterport, which allows a user to make complete 3-D models of places for a construction project, facility management, and property marketing, and many other purposes. McDavid received help with the scans from Cruz Buettiker, a graduate CoSci student.

The renderings, viewable on a desktop computer or a virtual reality platform such as Google Cardboard, are featured on the Department of Construction Science website.

The renderings have many applications for the construction industry, such as the first step in a project's building information modeling — the creation and management of digital representations of a building's physical and functional characteristics.

In a construction project, BIM files are commonly used as a means of exchanging data among different professionals involved in project design and construction.

With the scans, builders can also provide detailed construction documentation throughout the building process and import the scan data into additional modeling and design software.

Matterport scans are part of the Texas A&M construction science curriculum, whose offerings aim to provide students with the management and technical skills to succeed in the industry.



*View it!*

## STUDENT ENRICHMENT

The Budget Committee was chaired by Matt Summerville, The Brandt Companies, who also served as CIAC vice president.

The CIAC's generous financial support is a major factor that enhances the educational experience of all COSC students by funding a wide variety of programs and special events each year. In accordance with established financial accountability, a third-party independent review of the CIAC financial accounts was completed for 2018 and 2019.

The annual budgets for 2018 and 2019 are provided at the end of this report. The actual planned income for both 2018 and 2019 exceeded the budgeted amounts due to the continued growth in the number of CIAC members to 197 and 231 respectively in 2018 and 2019.

During 2018 and 2019, The CIAC contributed \$50,000 to the Aggie BUILD student organization fully funding two complete mobile containerized medical clinics.

The funds transferred into the Endowed CIAC Support Fund was increased from \$100,000 to \$150,000 in the 2018 budgets and reduced to \$95,000 in 2019 because the goal of \$750,000 was met at the close of 2019. The remaining \$55,000 from the original \$150,000 approved budget item for the CIAC Support Fund was transferred to a cash account for the maintenance of Francis Hall.

Expense line item funding was established in accordance with CIAC By-Laws for the major program areas: student enrichment, scholarships, research and studies, departmental support, and CIAC operations.









STUDENT ENRICHMENT

Student enrichment funds were provided by the CIAC for field trips, student competitions, graduation events, the awards banquet and career fairs. This financial support was key to providing students with a wide variety of enhanced learning experiences.

Each semester approximately 400 upper level COSC student board commercial charter buses and travel to 10 field trip sites within a 160-mile radius of College Station. CIAC members host most of these field trips and thus provide an enhanced learning experience for the students. During 2018 and 2019 the following industry partners hosted field trips:

- Acme Brick
- Bartlett Cocke General Contractors
- Bechtel Corporation
- Byrne Construction Services
- Durotech Inc.
- Dynamic Systems Inc.
- Hanover Company
- H-E-B Grocery
- Hensel Phelps Construction Co.
- Hines Interests LLP
- Jordan Foster Construction
- Kiewit
- Meritage Homes
- Nucor Steel
- Perry Homes
- Polk Mechanical Company
- Satterfield & Pontikes Construction Inc.
- SIMS Luxury Builders
- SpawGlass
- Toll Brothers Inc.
- Trio Electric
- Vaughn Construction
- Vulcraft Steel
- Webber LLC
- Wheeler/Texas Materials

The construction education program continued to be represented well in the competition teams in ethics, roofing, mechanical, commercial building, residential and heavy civil construction at the regional and national levels. The coaches for the competition teams were Professors Ken Williamson, Ben Ashburn, Mike Jordan, Boong Ryoo, Hernan Guerra, Lance Simms, Jonathan Houston and Gary Boldt.

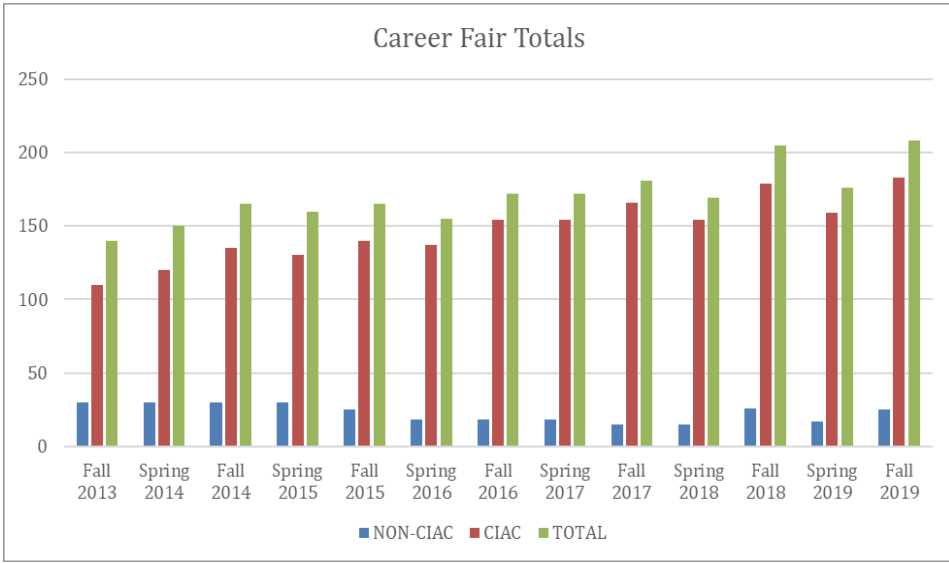
COSC students excelled in their respective competitions in 2018 with a first place finish in the ASC Region V Commercial Building Competition. Austin O'Neal was awarded a "top speaker" award as a member of the ASC Region V Heavy Civil Competition Team. The ethics competition team won 2nd place in 2019 at the AIC student competition in Philadelphia, PA.

The emphasis on written communications was also seen with David

Johnson's third place finish in the 2018 Associated General Contractors (AGC) James L. Allhands Essay Competition national essay writing competition.

Prior to graduation each semester, a hard hat ceremony is held to honor the graduates with the presentation of a personalized "Aggie Constructor" hard hat. Those students earning department-level awards for leadership and academic excellence were recognized with the presentation of a watch and their name on a permanent wall plaque. The award winners for 2018 and 2019 are provided on page 56.

The Spring 2018 Scholarship and Awards Banquet was held April 6, 2018 at the College Station Hilton. The Spring 2019 Scholarship and Awards Banquet was held on April 11, 2019 at the College Station Hilton as well. Each business entity member was entitled to a table for four at this event.



The first career fair each semester is reserved for CIAC member firms only in order to provide members with priority access to construction science students. As the largest department level career fair on the Texas A&M campus, the number of CIAC member companies at the career fairs were as follows:

- Spring 2018 – 153
- Fall 2018 – 179
- Spring 2019 – 159
- Fall 2019 - 183

## SCHOLARSHIPS

Each student's opportunity to pursue a degree, and the department's reputation for excellence are greatly enhanced by the financial support provided by CIAC members for annual as well as endowed scholarships.

The CIAC Endowed Matching Scholarship program is a catalyst for the number and value of scholarships, and a hallmark of our success. In 1999, before the CIAC matching scholarship program began, the department of Construction Science had 14 total endowed scholarship endowments. Today there are 115. The large majority of those new scholarship endowments were created through the CIAC matching gift program.

The total in permanent

endowed funds donated to our Department is \$ 5,633,232 (scholarships, graduate fellowships, professorships, etc.). The total in permanent endowed funds donated and matched through CIAC matches (including scholarships and endowed professorships) is \$3,723,470. Of that \$2,903,470 are endowed funds that will fund scholarships in perpetuity. The CIAC budget includes funds for twelve (12) Endowed Matching Scholarships by providing a \$10,000 match for a CIAC member who pledges \$15,000 for a \$25,000 named scholarship. Donations can be made over a period of time, up to five years, to achieve the minimum funding.

The following endowed matching scholarships were added in 2018 -2019, increasing the total number of scholarships to 123:

## NEW SCHOLARSHIPS:

### 2017

- Webb-George Scholarship (2017- not included in past biennial report, donation was after completion of booklet)

### 2018 – (12)

- Austin Commercial
- Brookstone
- Ann Eastwood Broussard (enhancement of existing scholarship-added married name)

- Bob and Pam Flowers
- Tom Followwill Memorial
- Haney Vernon Haney
- Luella and Earl Hurbert
- Stephanie Leubben
- David McClendon
- Teddy Peinado – Peinado Tiltwall
- Lynn and Bob Vacek and Blake Vacek Scholarship

### 2019 – (12)

- Steve Broussard (Ann Eastwood Broussard)
- Flintco
- Marek Family of Companies (9)
- McCarthy Construction
- Teddy Peinado - Peinado Tiltwall (2)
- Perry Homes (Todd Chachere Scholarship)
- Raba Graduate Fellowship (3 matches in 2019)
- John St. John (Mullin Scholarship)
- Texas A&M AGC Student Chapter
- Williams Foundation (Tulsa) (2019)

The following existing endowed scholarships were increased in value by CIAC matching funds:

- Ann Eastwood – 2005 Aggie Constructors Scholarship
- Marek Family of Companies

At the end of 2019, the market value of all endowed scholarships in support of COSC

students was \$4,038,742. If you add endowments for graduate fellowships, the total goes to \$5,633,232.

The following was a one-time CIAC Matched leadership scholarship in the amount of \$50,000 given to students in the College of Architecture who seek a minor in Leadership.

- Patti & Tom Owens '73 Family – Leadership Scholarship

A scholarship award ceremony is held each year at which time a representative from each scholarship provider presents their scholarship certificate to the deserving student and shares a reserved table at the banquet that follows.

The scholarship presentation ceremony for both 2018 and 2019 were held at the College Station Hilton. The ceremony is planned and conducted by the Sigma Lambda Chi Honor Society.

During the events, at the 2018 ceremony, 245 students received approximately \$414,000 in scholarships. At the 2019 event, \$444,800 in scholarships were presented to 235 students.

The CIAC budget includes funds for freshman scholarships. The combined funding by the CIAC resulted in 45 scholarships awarded to

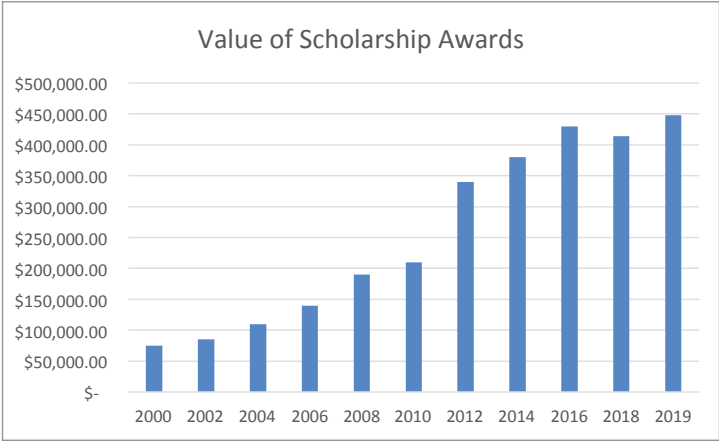
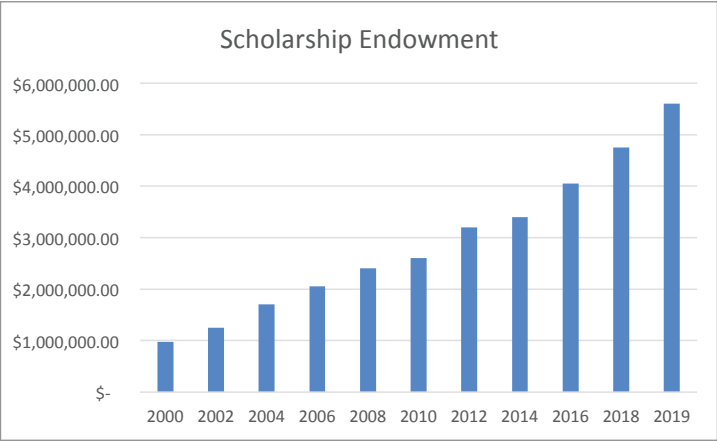
incoming freshmen during 2018-2019. This budget line also includes funding of \$1000 scholarships for students that participated in the department's summer construction management academies who apply to and are accepted into the construction science department.

The existing eight endowed professorships where increased with the addition of a new endowment:

- Raba Graduate Professorship

The market value of all endowed scholarships continued to grow to over \$5 million with the addition of 24 endowed scholarships, including additions to existing scholarships, in 2018 -2019, and the favorable economic climate.

COSC students submit applications online for university, college, and department scholarships provided by CIAC members, external professional organizations, individuals and private companies. A scholarship committee made up of faculty members review and rank the applications.







# COSCI PROF EARNS REGAN PRIZE FOR INTERDISCIPLINARY PROJECTS



J. Thomas Regan

**For a research agenda** that spans numerous disciplines, and leadership in an inaugural Texas A&M College of Architecture charrette that included students from all four of its departments, Zofia Rybkowski, associate professor of construction science, earned the 2018 J. Thomas Regan Interdisciplinary Prize.

Established by the College of Architecture's Dean's Advisory Council to honor Regan, former dean of the college and champion of

built environment interdisciplinary education, the prize is awarded annually to a faculty member selected by a faculty committee from a pool of nominees. Regan died in 2015.

Rybkowski's research takes place alongside colleagues from an array of disciplines.

She's leading a group of researchers from four university departments who are developing and testing environmentally responsible printing materials and methods in a two-year study funded by a \$500,000 X-Grant from the Texas A&M President's Excellence Fund.

In a 2015-2018 project, she led a group of researchers in architecture, visualization, materials science and engineering, and computer science in a National Science Foundation-funded study. She and her colleagues tested the performance of "smart" materials that alter their form in response to changes in air pressure or temperature while embedded in traditional and prototype materials used for building exteriors, or skins.

Her research interests also include all aspects of lean construction, a method to design and build structures that emphasizes procedures to maximize value and minimize waste.

She also played a leading role in a major new College of Architecture initiative, the inaugural Harold L. Adams Interdisciplinary Charrette for Undergraduates, where students from the college's four departments spent a weekend creating designs and construction schedules for amenities in a Langford Architecture Center outdoor space.

"Her insistence to include participants from all the college's departments at all levels of the event, including student organizers, consultants and jurors, ensured the event was truly collaborative and interdisciplinary," said Patrick Suermann, head of the Department of Construction Science, in a Regan Prize nomination letter.

Rybkowski holds the Harold Adams Interdisciplinary Professorship in Construction Science. She earned a Ph.D. in Civil and Environmental Engineering from the University of California-Berkeley in 2009, a Master of Science in Civil and Environmental Engineering from Cal-Berkeley in 2005, a Master of Philosophy in Civil Engineering from the Hong Kong University of Science and Technology in 2004, a Master of Architecture from the Harvard Graduate School of Design in 1991, a Master of Science in Biology from Brown University in 1987, and a Bachelor of Science in Biology from Stanford University in 1985.

Previous Regan Prize recipients include: Geoffrey Booth, Jorge Vanegas, Robert Warden, Mark Clayton, José Fernández-Solís, Anat Geva, Carol LaFayette and Ahmed Ali.

## DEPARTMENTAL SUPPORT/ CIAC OPERATIONS

The CIAC supplements the public funding provided by the state of Texas by budgeting funds for departmental support that provide for program enrichment and faculty development expenses for administrative supplies, equipment, travel, professional certifications and conference fees. This funding provided by the CIAC has been very important in allowing faculty members to travel for the purpose of participation in professional organizations, presentation of technical papers, and continuing education. The growth in the student enrollment has been aided by the CIAC funds provided for new student recruitment. Summer camps for high school students, and visits to community and junior colleges in the major population centers have been the primary means of attracting students.

## CIAC OPERATIONS

The budgeted funds for CIAC operations are used for meeting expenses associated with the spring, summer and fall meetings. The spring and fall meetings are held in College Station. Summer informational luncheon meetings are held in Houston, Dallas, San Antonio, Austin and Harlingen. A tailgate event is scheduled each fall. The Annual Scholarship Ceremony and Awards Banquet is funded by the CIAC and held the night prior to the spring CIAC meeting.

The growth in income from membership fees in 2018 and 2019 allowed for the transfer of \$245,000 from the CIAC's Foundation Account to the CIAC Support Account that was established in 2009. At the end of 2019, the market value of the CIAC Support Fund was \$547,158. The interest accrued from the CIAC Support Account is available income for the council's annual operating budget.

## CURRICULUM COMMITTEE

During 2018-2019, the committee chair was Brent Ballard with Marek Brothers. The issues addressed by the committee included a review of the department's course groups and the various classes in each group. The committee identified an emerging need in the curriculum to address the decrease in the percentage of incoming students with no industry experience. The curriculum was updated in 2019 to include the three major student success initiatives created by the university and College of Architecture. These are: The First Year Experience (FYE), the Meta Majors and the Cultural Discourse class. These 3 initiatives are aimed to serve the following identified goals:

- Increase 1st year retention for full time students from 92% to 95%
- Increase four-year graduation rates from 56% to 65%
- Increase six-year graduation rates from 82% to 85%
- Decrease achievement disparities

The First Year Experience (FYE) is aimed at helping students transition to college. It has not been adopted, but it is in the works for the upcoming years. The current plan of the FYE is to have all students take a number of topics in their first year regardless of their major. The list of eight topics to be covered over their first two semesters is:

- Accountability/Self and Goal Setting Awareness
- Social and Financial Wellbeing
- Diversity/Cultural Competence
- Professionalism/Career and Major Exploration
- Study Success Strategies
- Alcohol and Drug Awareness

- Stress Management
- Communication and Active Listening

The purpose of the meta-majors is to have all students in the College of Architecture be knowledgeable in certain topics, regardless of their major. Members of the College Academic Affairs Committee developed 47 outcomes or topics to be divided in the following five knowledge areas:

- Communication, Collaboration, Technology
- Design, Creativity, Innovation
- Analysis, Critical Thinking, Transdisciplinary
- Professionalism, Project Management, Leadership
- Ethics, Diversity, Social & Cultural Competence, Sustainability

To date, there has been more emphasis given to the top two knowledge area topics with subjects such as: communication, collaboration, technology, design, creativity and innovation.





# COSCI PROF EARNS GRANT TO DEVELOP VIRTUAL REALITY FIREFIGHTER TRAINING

**Current firefighter training methods** fall short of preparing new recruits for dangerous missions, a problem Jing “Eric” Du, Texas A&M assistant professor of construction science, is targeting by creating a virtual reality emergency simulation system with the aid of a \$465,000 National Institute of Standards and Technology grant.

“Rookies make a lot of dangerous mistakes because they lack real world experience,” Du said. “In the uniquely perilous world of firefighting, that familiarity is difficult to acquire without exposure to real hazards. We want to create a virtual reality simulation in which firefighters can safely train to become better equipped to do their jobs.”

Collaborating with Patrick Suermann, head of the Department of Construction Science at Texas A&M, and research partners at Northeastern University, Du is using virtual reality technology to create simulations including smoke, fire, water and other firefighting hazards.

Students and instructors from the Department of Defense Fire

Academy in San Angelo, Texas and the Texas A&M Engineering Extension Service will help develop and test the simulation.

Du’s system will track a firefighter’s vital statistics, gaze and body movements during firefighting simulations, providing data for post-training analysis.

The simulator could eventually be customized to help determine if a firefighter is ready for specialized responsibilities or performance-based promotions.

“If we can discover a framework for protocol, we can then rank and evaluate performance like a game,” said Du.

The three-year project is part of NIST’s Public Safety Innovation Accelerator Program, created to accelerate research, development, production and testing of user interface technologies through virtual and augmented reality. So far, NIST has funded \$6.4 million in PSIAP awards.

Du is also employing virtual reality technology in an NSF project aimed at improving firefighters’ navigational abilities.



## DEVELOPMENT COMMITTEE

Committee chair Tim Ross of Andrews Myers law firm guided the committee's recommendations for fundraising efforts with continued emphasis on endowed matching programs for scholarships and professorships, as well as a focus on fundraising within CIAC, and funding development with a broader outreach to major industry manufacturers, suppliers, vendors, and service provider companies.

In 2018, the committee, led by Tim Ross, proposed the creation of the Maroon Envelope Initiative, which included all past and present CIAC members, department faculty and past donors to our program. The initiative's purpose was to inform all parties on how all department donations are being used. It further explained how new donations could be used to benefit our program and students. The 477 Maroon Envelopes were mailed in October 2018. As a result of the initiative, all 12 CIAC matched endowed scholarships were assigned for 2018 and 2019. Also, additional donations exceeding \$150,000 were received by the department.

The development committee is now working on a proposal to bring a hands-on experience

similar to the United Kingdom's Constructionarium to Texas. Members of CIAC's budget and development committees will visit the UK to study Constructionarium procedures and facilities and propose in the near future how CIAC can develop a similar program.

## GRADUATE PROGRAM CURRICULUM, RESEARCH AND STUDIES COMMITTEE

The committee was chaired by Leland Rocchio of Jordan Foster Construction. The committee created eligibility standards and a selection procedure for all research proposals submitted to CIAC. See below for the approved procedure.

### Research Grant Procedure, Purpose and Eligibility

The purpose of the Construction Industry Advisory Council (CIAC) Research Grant is to provide the faculty in the Department of Construction Science (COSC) with the opportunity to conduct original research. The CIAC Executive Committee on Research will provide each year the desired topics to be researched during the Spring board meetings. The results of the research should mutually benefit the COSC faculty, CIAC, and the construction industry. Proposals that exhibit the potential to secure additional

external funding and whose topics match those selected by the CIAC during the spring board meetings will be given higher priority than those that do not.

Eligibility is not limited to any particular faculty - all COSC faculty may apply. Groups of two or more COSC faculty may submit a single proposal. Each faculty member may contribute to only one proposal. Multiple proposals from the same faculty member will not be considered.

The proposed research is expected to last one calendar year, with the start and end dates determined by the CIAC Research Committee. The total available funding is \$25,000. There are no restrictions on the use of the funds, however, an intermediate status report will be required to be submitted/presented during the CIAC Spring board meeting as explained further in the document. University indirect costs do not need to be included, other than fringe benefits on salaries.

### Technical Requirements

Submissions must include:

- Proposal (not exceeding four pages)
- Curriculum Vitae (not exceeding two pages)

The proposal should include the following items:

- Title of the proposed research project
- Motivation and objectives of the proposed research
- Review of current work relevant to the proposed topic of study
- Proposed procedures and methods to achieve the research objectives
- Research plan including a schedule of work and specific deliverables
- Budget and budget justification
- Potential benefits to the faculty member, COSC, CIAC, and industry

All proposals and CVs should be submitted electronically to Ms. Melissa Sodolak in the COSC Industry Relations Office, by no later than two weeks prior to the Fall CIAC Board Meeting. All CVs and proposals will be forwarded to the CIAC Committee lead for Research. The proposals and CVs should be submitted in PDF Format, standard 8½ x11 page, minimum 11 pt font, 1.15 line spacing, 1" margins all around, and text aligned to the left. Any figures, tables, and illustrations must be included within the four-page limit.

### Proposal Evaluation

All proposals will be reviewed by the CIAC Research Committee during the fall CIAC Board meetings. The successful

Points Earned	Points Possible Criteria
30	<i>Leverage:</i> Will the award of these funds lead to additional funding?
	Provides necessary seed or matching funds for an externally funded project
	Additional funding sources are clearly identified
20	<i>Value:</i> Does the project advance knowledge in construction?
	The specific topic has not been previously addressed
	The topic will, or has potential to, add value to construction practice
15	<i>Methods:</i> Are the methods for achieving the objectives appropriate?
	Methods are clearly stated
	The schedule is appropriate
15	<i>Budget:</i> Is the budget justifiable for the activities proposed to be carried out?
	Project expenses are identified and accurately defined
	Graduate student support is included, if necessary
10	<i>Benefit:</i> How does the proposed research benefit COSC, CIAC, and industry?
	Deliverables represent a tangible benefit to CIAC members and industry
	Benefits to COSC faculty are clearly defined
10	<i>Quality:</i> Is the proposal well-written?
	Proposal is easily understood
	Objectives and expected results are clearly stated
100	Total

proposal will be selected according to a vote by the CIAC Research Committee and their decision will be final. The proposals will be evaluated according to the following criteria:

Limitations

COSC researchers are required to present their proposals to the CIAC Research Committee at the fall CIAC Board Meeting. If the researchers do not present their proposals, or if their proposals are presented by a teaching or research assistant, they will be disqualified from consideration.

Once the grant has been awarded, the researcher must provide an intermediate status report to the CIAC Research Committee at the spring CIAC Board Meeting. Final deliverables stated in the proposal must be received within 30 days of the project end date. Failure to provide the deliverables by the deadline will disqualify the research team from future CIAC grant awards.

The CIAC Research Committee reserves the right to discontinue funding if: (1) Researcher fails to comply with the stated requirements; (2) Deliverables do not comply with what was stated in the proposal; or (3) Researcher does not make adequate progress. In such cases, written notice will

be sent to the COSC department head, COSC graduate program coordinator, and the researcher.

The committee awarded a \$25,000 research grant for 2018 to Dr. Julian Kang for the research of using 3D printing technology for the creation of emergency shelters which can be assembled by a team of two people. The 2019 research grant was awarded to Zofia Rybkowski and Manish Dixit for collaboration with other programs in the research of 3D printing technologies.

Another major effort for the committee during 2018-2019 was the reestablishment of a non-thesis master's program for construction management. This was successful, and the program now offers a non-thesis option for our master's students.

MEMBERSHIP COMMITTEE

The membership committee was chaired by Lauren Rossman of Kiewit. In 2018-2019, the committee reviewed and revised the process for annual nominations for the Constructor Hall of Fame Award, and the qualifications that should be considered. Below is the newly approved Hall of Fame Selection Procedure that has been implemented.

### HALL OF FAME SELECTION PROCEDURE

**1.** The executive director will post by Sept 1 annually on the COSC and ARCH websites as well as send an email to CIAC members and COSC faculty requesting nominations for the CHFA award. An award summary, selection criteria, due date, past winners, and link for nomination submission will be included in the request for nominations.

**2.** Nominations will be collected via hardcopy/email before October 15 for discussion in the fall meeting to include: Nominator name, company, phone, email, alumni status and year; nominee name, company, phone, email, alumni status and year (if known), 300 words or less: 1) Example(s) of their commitment to service and support of the COSC Dept. 2) Example(s) of leadership within their field or construction industry.

### COSC CONSTRUCTOR HALL OF FAME NOMINATIONS

**3.** The executive committee will evaluate the candidates before the fall CIAC board meeting according to the criteria above, using a 1-5 scale. All nominees with ratings will be submitted to the membership committee

during the fall meeting.

**4.** The membership committee will select the winner during the fall CIAC board meeting.

**5.** The membership chair will share the committee's selection with the CIAC president, executive director, and industry relations coordinator at the conclusion of the fall meeting.

**6.** The CIAC president and executive director will invite an appropriate presenter and the winner to the spring CIAC banquet as soon as possible, with the expectation that the recipient will be able to plan for and attend the banquet to receive their award.

**7.** The award winner will receive a plaque, an invitation to speak at COSC capstone class/reception with department head/dean, recognition in the COSC newsletter and tickets to a fall Aggie football game. The award winner's name will also be placed on the CHFA plaque in the COSC office.





# COSCI HEAD AIMS TO POSITION DEPARTMENT AS CONSTRUCTION PARTNER FOR SPACE-BASED INITIATIVES



Patrick Suermann



Manish Dixit

**As plans to settle the moon** and Mars continue to gather steam among entrepreneurs and corporations, Patrick Suermann, head of the Texas A&M Department of Construction Science, is laying the groundwork to position the department as a leading research consultant to

visionaries shooting, literally, for the moon.

"Any group that hopes to establish a presence on another world is going to need construction partners," said Suermann. "This department can become a leading research hub to develop building procedures in low and zero gravity environments."

To open this new avenue for his department, Suermann is forging partnerships with researchers at NASA, the U.S. Air Force and private groups pursuing space-related projects. His efforts included a Nov. 13, 2018, flight with a group of private sector and military researchers aboard a modified Boeing 727 aircraft operated by Zero Gravity Corporation that performed a series of controlled free-fall maneuvers to create microgravity conditions for its passengers.

On the flight, Suermann operated a hand drill on samples that

simulate rocks on the moon and Mars in an experiment headed by James Crowell of Crow Industries, which develops technology for use in extreme environments. Crowell is aiming to learn how these rocks interact with drilling machinery and how the resulting dust travels in low and zero gravity situations.

Suermann and his fellow researchers wore biometric monitors that recorded data for two construction science faculty members, Manish Dixit and Eric Du, who are developing virtual reality-based simulations to test low and zero gravity's impact on human spatial cognition, a key factor in the ability to perform basic and high-level tasks in space.

"Future space missions will need interdisciplinary crews with excellent spatial cognition to design, engineer, and construct human habitats," said Dixit. "These crews may need training that specifically prepares them for extended periods of weightlessness, which can cause disorientation that compromises their health, comfort, and safety."



*View it!*

## AWARDS

The Constructor Hall of Fame Award was established in 2001 to honor non-alumni who made a difference in the industry and helped advance the construction science program at Texas A&M. At the fall 2011 CIAC meeting, CIAC voted to accept a membership committee's recommendation opening nominations to Texas A&M former students.

The 2018 Constructor Hall of Fame Award recipient was Thomas D. Owens '73, chief risk officer and senior managing director with a distinguished career in project development and management at Hines in Houston, Texas, was a CIAC founding member in 1998.

In 2019, the Constructor Hall of Fame Award was put on hold for a year while the selection procedure was being created and implemented for the selection of the 2020 award winner.

### HALL OF FAMER:



**Tom Owens**, executive vice president and chief risk officer at Hines, received the 2018 Construction Hall of Fame Award.

### Student Advocates:

Professor Larry Fickel – 2018 and 2019

### Fluor Top Educators

Professor Tony Marraro – 2018

Professor Mike Jordan- 2019

### Excellence in Scholarly Work and Research

Professor Eric Du – 2018

Professor Changbum "Ryan" Ahn- 2019

### 2018 AND 2019 OUTSTANDING STUDENTS:

#### The Outstanding Graduate Student Awards were presented to:

Arian Vaziri, Spring 2018

Tao Song, Summer 2018

Ellie Solhjokhah and

Songjukta Datta Fall 2018

Aditya Vijakumar, Spring 2019

Daniel Hirsch, Summer 2019

Md. Nazmus Sakib, Fall 2019

#### The Gene Murphree – AGC Medal was presented to:

Franklyn Autry, Spring 2018

Ashley Williams, Summer 2018

Blake Norrid, Fall 2018

Grant Miles Neal, Spring 2019

Suril N. Soni, Summer 2019

John Bruszer, Fall 2019

William 'Bill' Zwerneman, Fall 2019

#### The Cumberland Craftsman Award was presented to:

Stephani Leubben, Spring 2018

Vivian Medina, Summer 2018

Christopher Poole, Fall 2018

William Berzins, Spring 2019

Ian Ho, Summer 2019

Marcus Comello, Fall 2019





## INTERSHIPS

The Construction Science Internship Program, began in 2003 with 37 interns, and grew to 297 in 2019. Each graduate of the construction science program must complete a 15-week, semester-long professional internship during a fall or spring semester.

Many of the students combine a summer work experience to gain further hands-on experience. The success of the internship program is due in large part to the support of CIAC members. From 2018 to 2019, CIAC members hired over 90% of the program's 650 interns. The internship is a seven credit-hour course and designated writing-intensive class where a final letter grade is based on required weekly reports that are graded for proper grammar and spelling as well as clarity and completeness. During 2018 and 2019, approximately 70% of all interns were offered a job prior to graduation by their internship provider.

In summer 2019, Jonathan Houston, MEP senior lecturer, did an internship with Dynamic Systems (DSI). Houston came from the MEP engineering side of the commercial construction industry and has the goal of continuously learning and getting more experience on the contracting side of the industry.

He worked on DSI crews installing air handlers, ductwork,

VAV boxes, hydronic piping, and domestic hot water piping. His learning was invaluable. The first-hand knowledge of how MEP systems are constructed gave Jonathan many stories to take back into the classroom.

With DSI's permission, Jonathan also took many pictures of the project which he also uses in the classroom. A benefit to DSI is that Jonathan mentions these experiences during lectures, which advertises DSI's company and work to the students. To sum it up, Jonathan became a better instructor, the students get a better education, and DSI gets good PR – wins all around! Jonathan is currently working on lining up an electrical internship in the summer of 2020.









## STUDY ABROAD 2018-19

The Department of Construction Science's Study Abroad Program in London continued its acclaimed, high impact learning experience in London, England.

The program had 42 students participating in the spring and summer programs plus an additional 28 students participating in the Spring Break Constructionarium project in 2018 and 2019. (See: <http://www.constructionarium.co.uk/>)

Construction companies in England hosted our students on over 20 construction sites in the London area including residential high-rise, commercial and infrastructure projects. Among these was the refurbishment of an inner-city Victorian police station into a high security jail for terrorism suspects while maintaining its stables for horse patrol officers.

The Department of Construction Science's setting its own "full load" academic curriculum during the study abroad semester, and providing the faculty to teach it, are seen as unique and desirable elements of a successful program by British educational professionals who have reviewed it. Coupling this academic work with a follow-up 8-week internship receives very favorable comments from British credentialing agencies. Our students consistently



**Steve Rodgers -**  
*International Education & Internship Coordinator*

receive high marks from our British hosts such as the Institute of Civil Engineers: "Texas A&M students are the best-behaved students ever! Very polite and lovely. It is an honor to host them in the Library Debra Francis-Librarian at Institute of Civil Engineers."



## JOB PLACEMENT

Two career fairs are held each long semester. Session I, dedicated to Construction Industry Advisory Council members, is the largest department-level career fair at Texas A&M. Session II, a smaller career fair for non-CIAC members, is held on campus two weeks after Session I. The number of participating companies in the fairs increased from 154 in spring 2018 to a record high of 183 in fall 2019. CIAC members accounted for 92% of industry participation in the two career fairs.

The job placement rate remained relatively steady during 2018 and 2019 in the 85-90% range, which closely matches the percentage of graduating students who continue to work in the construction industry. Many of our students have contracts with the United States armed forces and others move on to get a master's degree in a field of their choice. The reported starting salaries showed a slight increase from an average of \$60,805 for Fall 2016 graduates to \$64,809 for fall 2019 graduates.

A summary of starting salaries for 2018 and 2019 Bachelor of Science Construction Science graduates is provided at the end of the booklet under hiring data.





## COSCI PROF STUDIES VR METHOD TO IMPROVE STUDENTS' PUBLIC SPEAKING



Amir Behzadan

**Virtual reality devices** could become a new tool to help students who struggle with public speaking anxiety, said Amir Behzadan, Texas A&M associate professor of construction science.

"In science, technology, engineering and mathematics fields, many employers are looking for people who can effectively communicate their ideas in a public setting and work in teams, but not necessarily someone who graduated with a 4.0 GPA," said Behzadan.

In a one-year study funded by the Engineering Information Foundation, Behzadan and principal investigator Theodora Chaspari, Texas A&M assistant professor of computer science and engineering, are studying whether students can reduce their level of public speaking anxiety by making presentations on general-interest topics to a variety of computer-generated audiences they see in a low-cost, VR headset.

"This study will examine how wearable devices and VR can be integrated to provide new, personalized opportunities to improve students' public speaking effectiveness," said Chaspari.

Student participants will speak to virtual audiences with varying demographic, characteristics, attention levels and venue sizes while a consumer-grade "smart" watch records physiological data, such as pulse, sweat level, and voice pitch and volume that are related to the speaker's performance and anxiety level.

These readings will be compared with benchmark data recorded with the subject's presentations to a live audience.

"When we compare the two readings, we'll be able to see how much the VR presentations helped reduce a subject's fear of public speaking and improve his or her speaking performance," said Behzadan.

In a later portion of the study, students talking to a live audience will get instant feedback on their presentation via a wireless headphone connection from researchers monitoring the speakers' physiological data.

"This will strengthen a student's public speaking skills because he or she will instantly be aware of an insecure-sounding voice, excessive hand movements, or other symptoms of elevated, stress-related physiological signals, and improve their presentation on the fly," he said.

## FACULTY AWARDS

In 2018 – 2019, the following COSC faculty members were recognized for excellence in teaching, service and research:

### Ryan Ahn

*J. Thomas Regan Interdisciplinary Faculty Prize*

### Youngjib Ham

*2019 ASCE ExCEED (Excellence in Civil Engineering Education) Teaching Fellows, 2018 Outstanding Reviewers for ASCE Journal of Construction Engineering and Management*

### Steve Rodgers

*Association of Former Students (AFS) Faculty Teaching Award*

### Zofia Rybkowski

*Presidential Impact Fellowship*

### Zofia Rybkowski

*J. Thomas Regan Interdisciplinary Faculty Prize*

### Elizabeth Smith

*Star Performer Award (selected in 2018, awarded in 2019)*

### Elizabeth Smith

*President's Meritorious Service Award*

### Shelley Smith

*Presidential Meritorious Service Award*

### Ken Williamson

*Associated Schools of Construction (ASC) Lifetime Achievement Award*

In 2018 – 2019, the following COSC faculty members were awarded Faculty Emeritus status:

### James Smith

### David Bilbo

### Bob Segner

### George Eustace

## FACULTY PROMOTIONS

**Sarel Lavy** promoted to full professor

**Edelmiro Escamilla** promoted to associate instructional professor

**Ray Grisham** promoted to senior lecturer

## NEW FACULTY

The goals of the 2018-2019 faculty searches were to continue strengthening the nontenure ranks with highly experienced industry professionals, and to increase the department's research capacity with accomplished tenure and tenure-track professors with funded research projects.

Over 120 years of combined industry experience was added to the nontenure track faculty with the hiring of Randy Birdwell, Hernan Guerra, Jonathan Houston, Lance Simms and Larry McGinn as senior lecturers.



Hernan Guerra '03

**Hernan Guerra '03** is a senior lecturer and industry relations coordinator in the Texas A&M Department of Construction Science. He has over 20 years of construction experience in Mexico and the United States. Prior to joining Texas A&M, Guerra worked for 15 years as a senior project manager at Clark Construction Group. He worked in the construction of large commercial projects in six states. Some

of those projects include: two military healthcare facilities, each at over \$1 billion, two convention centers, two office buildings, one hotel and marina, and an airport terminal. Guerra holds a Bachelor of Science in Architecture from Monterrey Institute of Technology and Higher Learning in Monterrey, Mexico and a Master of Science in Construction Management from Texas A&M University.



Lance Simms

**Lance Simms** is a senior lecturer in the Texas A&M Department of Construction Science. He has over 30 years of experience in the construction industry. Prior to joining the faculty at Texas A&M,

Simms served as the director of planning & development services for the City of College Station, Texas. He holds a Bachelor of Science degree in Building Construction from the University of Louisiana Monroe and a Master of Science degree in Construction Management from Texas A&M. He is also a certified building official.



Jonathan Houston '06

**Jonathan Houston '06**, PE, LEED AP BD+C, CPDT is a senior lecturer in the Texas A&M Department of Construction Science. A former member of the Corps of Cadets and Fightin' Texas Aggie

Band, he commissioned into the U.S. Army as an engineer and served eight years. He has six years of experience as a professional engineer at M&S Engineering, where he designs and performs QA/QC inspections on mechanical, electrical, and plumbing systems in commercial construction projects.



Larry McGinn '03

**Larry McGinn '03** has spent his 20-year career working in the industrial construction sector building large refining and chemicals capital projects as a construction contractor for

major oil and gas owners. His experience was in the EPC/EPCM environment as a site construction manager responsible for projects averaging around \$400-500 million. This background included significant efforts

associated with front end planning, field construction and startup activities. McGinn also has background with offshore drilling operations. McGinn earned a graduate construction management degree at Texas A&M and an undergraduate construction management degree at Louisiana State University.



Randy Birdwell '78

**Randy Birdwell '78** is the homebuilding industry director/senior lecturer for the Texas A&M Department of Construction Science. He has 40 years of high-volume production homebuilding

experience, including 30 years as a company owner, president, CEO or chairman. His award-winning company, Emerald Homes, was merged into D.R. Horton, which led to the nationalization of the Emerald brand. While at Horton, Birdwell managed \$2.3 billion in assets - 12 housing divisions, which closed 23,000 homes in one year. He is past president of the Greater Houston Homebuilders Association and the Texas Association of Builders and a senior life delegate and former national vice president of the National Association of Home Builders. He and his wife Suzanne serve as chairs of the Texas A&M University System Chancellor's Century Council. Birdwell holds the G. Seagraves '80 Fellowship in Residential Construction, serves as a

trustee of Asbury Theological Seminary, fellow of the Center for Housing and Urban Development and member of the College of Architecture Development Advisory Council. His residential capstone academic scaffold appeared in Builder.



Dr. David Jeong

**Dr. David Jeong** is the James C. Smith CIAC Endowed Professor in the Texas A&M Department of Construction Science. He has six years of industry experience as a field engineer and cost estimator

and 15 years of experience in academia as a faculty member. Jeong's areas of expertise include cost estimating, risk assessment and analysis, contract time determination, asset management, data visualization, artificial intelligence, and integrated project delivery. Throughout his career, Jeong has received more than \$8.5 million from various funding agencies to support his research. He has published more than 100 technical journal and conference papers in his field and has received notable research awards, including the 2016 ASCE Journal of Construction Engineering and Management's Best Scholarly Paper Award, 2015 CII Distinguished Professor Award, 2010 CII Researcher of the Year Award, and 2008 Institute of Industrial Engineers (IIE) Transactions Award – Best Application Paper.



## FACULTY RESEARCH PROJECTS AND GRANTS

Below is a list of active, funded projects and grants led by the COSC faculty. This is by far the most the department has ever been awarded and the most by any construction science program in the nation. For more information, please contact individual faculty members.

### **Guidance for the Use of UAS During Suboptimal Environmental Conditions by Texas Department of Transportation (TxDOT) - November 2019 to October 2021 - Co-PI: Youngjib Ham**

This research project will address key challenges of unmanned aerial system (UAS) operations for visual monitoring in suboptimal conditions such as wind, rain, mist, smoke, and ambient lighting. The outcome of this study can provide guidance for UAS flight operations in suboptimal conditions, and recommend settings, procedures and workflows to ensure data quality collected by UAS for highway mapping, bridge inspection, crash site data collection, and real-time traffic monitoring.

### **FW-HTF-RM: Augmenting Spatial Cognition Capabilities of Future Workforce to Enhance Work Performance in Altered Environments Using Virtual Reality, by U.S. National Science Foundation - October 2019 to September 2022 - PI: Dr. Manish Dixit**

This research project will enable the future workforce to work in unfamiliar environments, including desolate, hard-to-reach places such as deep space, low Earth orbit, deep ocean, and polar regions. Virtual Reality, eye tracking, and electroencephalography will be combined in a cost-effective, educational platform to inform design principles for scenario-based simulations and games to train the future workforce to adapt to and work in altered environments.

### **FW-HTF-P: Collaborative Research: Anthropocentric Robot Collaboration in Construction by U.S. National Science Foundation NSF - September 2019 to August 2020 - PI: Dr. Ryan Ahn**

This research project will carry out a human-centered investigation where a human worker's response to different scenarios of human-robot collaboration in construction is non-invasively and continuously monitored in order to maximize the overall performance of human-robot collaboration. The outcome of this study has the potential to build foundational knowledge on how we can prepare our existing and new workforce for future construction.

### **ERC Planning Grant: Engineering Research Center for AI Construction AI-Con by U.S. National Science Foundation (NSF) - September 2019 to August 2020 - Co-PI: Dr. Amir Behzadan**

This research project will support the development of a research roadmap for implementing artificial intelligence in the construction industry and the formation of a multi-institutional team working toward an NSF Engineering Research Center (ERC). Impacts of this ERC will include significant advancements in artificial intelligence algorithms, human-machine interfacing, machine learning for generative design, and deep learning that will transform how construction projects operate from conception to design to completion.

### **International Research Project: Digitalization of Construction Contract Requirements using Artificial Intelligence and Natural Language Processing by Institute of Information and Communications Technology Planning and Evaluation (IITP, Korea) - July 2019 to December 2020 - PI: Dr. David Jeong**

This research project is an international collaboration with a group of researchers at Yonsei University in South Korea. The goal is to explore and test AI and NLP-based algorithms that can analyze major construction contract requirements from a large number of historical construction contract documents, then automatically extract and organize major contractual requirements of a new project with a possible level of risk identification.

### **Phase II - Construction Activity Sequencing Logics Using Daily Work Reports Data by Montana Department of Transportation - May 2019 to May 2020 - PI: Dr. David Jeong**

This research project will develop construction activity sequencing logics for different types of highway projects based on historical data, which can help quickly identify the most common work sequence of the given project and determine the project schedule. Results are expected to significantly improve the accuracy and reliability of project scheduling practices.

### **Analysis of the Delivery of Design-Build (DB) Compared with Design-Bid-Build Projects by Maricopa Association of Governments and Arizona Department of Transportation - May 2019 to March 2020 - Co-PIs: Dr. David Jeong, Dr. K.C. Choi**

This research project will analyze, compare, and contrast three design-build (DB) projects. A design-bid-build (DBB) project will be used as a control project which is similar to the three DB projects in terms of key project parameters such as scope, function, and type. This project will identify similarities and differences between the

contractual methods via highly extensive case studies. The primary focus of the study will be to gain better understanding of the cost and time differences between the two contractual methodologies and other lessons learned.

**Developing an Improved South Dakota Construction Cost Index by South Dakota Department of Transportation - April 2019 to March 2020 - PI: Dr. David Jeong**

This research project will identify current and potential uses for construction cost indices (CCIs) in the South Dakota Department of Transportation and develop methodologies for calculating, maintaining, and using a CCI for each use. This study will also evaluate the level of risk or uncertainty for projections made using the CCI methods.

**Systematic Approach for Estimating Construction Contract Time: A Guidebook (NCHRP 08-114) by National Cooperative Highway Research Program, Transportation Research Board, National Academy of Science - August 2018 to April 2020 - PI: Dr. David Jeong, Co-PI: Dr. K.C. Choi**

This research aims at developing a comprehensive guidebook encompassing procedures, methods, and tools for determining contract time that can work for a wide spectrum of highway infrastructure projects. A systematic approach and a risk-based methodology will be employed to provide reliable contract time estimation methods over the project delivery process.

**Cognition-Driven Display for Navigation Activities: Personalized Spatial Information System Based on Information Personality of Firefighters by National Institute of Standards and Technology - June 2018 to May 2021 - Co-PI: Dr. Patrick Suermann**

This project proposes and tests an innovative concept called spatial information personality (SIP), a cognitive profile of information-taking preference and behavioral patterns at the individual level. SIP of firefighters will be tracked by quantifying individual reactions to different types, quantities, and display methods of information during virtual reality-based fire training. The collected SIP data of individual firefighters can be integrated as a necessary part of their personal files.

**Collaborative Research: Transforming Teaching of Structural Analysis through Mobile Augmented Reality by U.S. National Science Foundation - August 2017 to July 2020 - PI: Dr. Amir Behzadan**

The objective of this collaborative project is to transform existing teaching pedagogy in structural analysis by designing and testing a mobile augmented reality (AR) platform that superimposes the

visuals of the textbook with interactive computer-generated 3D models of structures under load. In doing so, the potential of AR for improving learning and increasing student engagement in the learning process is systematically assessed.

**Nonintrusive Elderly Smart-home Healthcare System for Monitoring Short-term and Long-term Anomaly in Daily Activity Patterns by Korea Agency for Infrastructure Technology Advancement - March 2017 to December 2019 - PI: Dr. Ryan Ahn**

This research designs a smart home monitoring platform of elderly people's daily activities to improve their health. The proposed platform will continuously monitor and evaluate daily activities of the elderly, and identify the occurrence of emergent situations, including accidents, and the decline in physical and cognitive functions.

**Uncovering Potential Risks of Wind-induced Cascading Damages to Construction Projects and Neighboring Communities by U.S. National Science Foundation - January 2017 to December 2019 - PI: Dr. Youngjib Ham**

This project will create and validate a new streamlined imaging-to-simulation framework to prevent wind hazard events from causing catastrophic damage to construction projects and neighboring communities.

**A Natural Language Based Data Retrieval Engine for Automated Digital Data Extraction for Civil Infrastructure Projects by U.S. National Science Foundation - September 2016 to December 2019 - PI: Dr. David Jeong**

This research proposes a novel approach for a fast and unambiguous reuse of digital models for the civil infrastructure industry by developing an automated data retrieval engine capable of recognizing user information from their natural language queries, such as words, phrases, or questions, and extracting the desired data from heterogeneous digital datasets by employing the recent advances in natural language processing techniques and machine-learning based semantic measure methods to develop the data retrieval system.

**Revealing Hidden Safety Hazards using Workers' Collective Bodily and Behavioral Response Patterns by U.S. National Science Foundation - January 2016 to December 2019 - PI: Dr. Ryan Ahn**

The objective of this research is to examine whether, how, and to what extent workers' collective bodily and behavioral response patterns identify recognized/unrecognized hazards for the purpose of enhancing safety performance in construction environments.

# COSCI STUDY ABROAD STUDENTS BUILD REPLICAS OF ICONIC BUILDINGS IN UK



Jorge Vanegas (pictured right)

**Texas A&M construction science students** studying abroad in the United Kingdom in March 2018 battled chilly, windy, rainy weather as they built scaled-down replicas of two iconic European buildings at Constructionarium, which provides students with a “hands on” building experience on a 15-acre site in northeast England.

Working in two teams, students overcame the elements and equipment-related setbacks to finish the replicas of the Gherkin, a London skyscraper, and the Millau Viaduct, the world’s tallest bridge, said Jorge Vanegas, dean of the College of Architecture, who visited the jobsite March 11-17 with Patrick Suermann, head of the Department of Construction Science.

To complete the task, the 33 students assumed roles typically performed at a jobsite, such as project managers, safety officers,

accounting and scheduling heads, and others.

“I cannot express how proud I am of our students,” said Vanegas. “Both teams persevered and got the job done, despite obstacles they faced along the way.”

The students were led by construction science faculty Gary Boldt and Steve Rodgers.

The weeklong build, reported by KBTX-TV, is part of what British educators, construction professionals, and legal experts regard as a unique, transformational learning experience, said Rodgers.

“With the goodwill that we’ve built with the British construction industry over the years of this study abroad program, they give us opportunities to go do and see things that other students simply do not have, even universities here in the UK,” he said in a 360-degree video produced by Texas A&M.

College students also attend study abroad in venues located in Germany, Italy, and Spain



# PROJECT TO YIELD COST ESTIMATING TOOLS FOR HIGHWAY CONSTRUCTION



Kunhee Choi

**A Texas A&M construction science professor** is working to lower the cost of highway construction bids by optimizing data-driven construction scheduling methods in advance of the U.S. government implementing the \$1.5 trillion highway infrastructure rebuilding plan proposed last February by the Trump administration.

Kunhee Choi, associate professor of construction science is joining colleagues from Iowa State University and Northeastern University on this 20-month, \$500,000 project, “Systematic Approach for Estimating Construction Contract Time,” funded by the Transportation Research Board of the National Cooperative Highway Research Program.

The research team will develop a comprehensive guidebook detailing procedures, methods and tools for estimating contract time for highway projects.

“In current practice, contract times are estimated largely on historical data, intuition and engineers’ gut feelings,” Choi said. “The guidebook will assist state transportation agencies in developing the most reliable contract times for highway renewal projects.”

When the Department of Transportation sets a project period significantly shorter or longer than industry estimates, competing contractors are forced to increase bid cost to either accelerate or delay project construction schedules.

“Either way, the public loses due to inaccurate and sometimes arbitrary contract completion times,” Choi said.

Choi’s team will use information from DOT databases to develop a data-driven, risk-based methodology that credibly estimates contract time for most projects, including those using alternative contracting methods.

Choi is the holder of the Cecil Windsor Endowed Professorship in Construction Science. He earned a bachelor of architectural engineering from Korea University, a master of science in construction management from Texas A&M and a Ph.D. in Civil and Environmental Engineering from the University of California at Berkeley.

A member of the Texas A&M faculty since 2010, Choi’s research has centered around experimenting with and creating state-of-the-art methods and analytical models to optimize the efficiency of the U.S. transportation system by working to improve public safety and mobility.

# WHAT ARE CONSTRUCTION ACADEMIES?



Edelmiro Escamilla

**The Texas A&M Department of Construction Science** offers a series of four, four-day Construction Academy Careers Programs and two, five-day RELLIS Construction Skilled Trades Academies for high school students designed to acquaint students with the study of and potential careers in the construction industry.

The academies are coordinated by Edelmiro Escamilla, instructional assistant professor of construction science, and focus on social, intellectual, and emotional development of rising and admissible youth, ages 14-17. Construction academies combine academic instruction with fun social activities. Participants leave the academies with an excellent outlook on the construction profession.

These academies are sponsored by CIAC members and help recruit high school students into the construction industry. Students accepted to the Texas A&M construction science program who attended these academies also get an initial departmental scholarship.

Participants are selected to attend construction academies based on their entire application, their interest in the built environment, and their intent to continue their education in a field related to construction.

Students admitted into the academies are enrolled in the academy closest to their home. Students will be notified through email by the second week in May.

The academy is free for students and includes two meals per day, activities, site visits, and takeaways.

**QUESTIONS?** Email your questions about construction academies in 2020 to Professor Escamilla at [edelmiro-escamilla@tamu.edu](mailto:edelmiro-escamilla@tamu.edu).





## CIAC BUSINESS ENTITY MEMBERS 2018-2019

3Space Makers LLC  
 Adolfson & Peterson  
 Construction  
 AECOM HUNT  
 Allen Butler Construction  
 Allied Orion Group  
 ALPHA Facilities Solutions LLC  
 American Constructors  
 American Woodmark  
 Corporation  
 Andres Construction Services  
 Anslow Bryant Construction  
 Architectural Fabrication  
 Archer Western / Walsh Group  
 Austin Bridge & Road  
 Austin Commercial LP  
 Austin Materials  
 Autodesk Inc.  
 Avinext  
 BKT Construction  
 B.L. Harbert International  
 Baker Triangle  
 Balfour Beatty Construction  
 Bartlett Cocke General  
 Contractors  
 Bechtel Corporation  
 BMWV Constructors  
 Booz Allen Hamilton  
 Bosworth Steel Erectors Inc.  
 Brasfield & Gorrie General  
 Contractors  
 Britt Rice Electric LP  
 Broadbuss & Associates  
 Brookstone LP  
 Brown & Root Industrial Services

Burns & McDonnell  
 Burrow Global LLC  
 Byrne Construction Services  
 C&W Services  
 CA Partners Inc.  
 C.A. Walker Construction  
 Caddell Construction Co., LLC  
 Cadence McShane Construction  
 Company  
 Cajun Industries LLC  
 Capco General Contracting  
 Cash Construction Company Inc.  
 CBG Building Company  
 CenterPoint Energy  
 Central Builders Inc.  
 Chamberlin Roofing &  
 Waterproofing  
 Chesmar Homes  
 Clark Construction Group LLC  
 Clark Construction of Texas  
 Clune Construction  
 Cooper Construction  
 CORE Construction  
 CRB Construction  
 Crain Group LLC  
 The Crossland Companies  
 Cummings Electrical  
 Curran Contracting Company  
 David Weekley Homes  
 DN Tanks  
 DuPont de Nemours Inc.  
 DPR Construction  
 D.R. Horton  
 Drees Custom Homes LP  
 Drymalla Construction Company  
 Inc.  
 Duinick Inc.

Duke Realty  
 Durotech Inc.  
 Dynamic Systems Inc  
 EDI Building Consultants Inc.  
 EE Reed Construction LP  
 Embree Group of Companies  
 Embrey  
 EMJ Corporation  
 Endurance Builders  
 ERDMAN  
 Evers & Sons Inc.  
 ExxonMobil  
 F.A. Nunnally Co.  
 F.L. Crane & Sons  
 FA Peinado LLC  
 Flatiron Construction  
 Flintco LLC  
 Flynn Southwest, LP (formerly  
 BRI Commercial Roofing)  
 Forney Construction LLC  
 Franco Builders  
 Frank Dale Construction  
 Fransen-Pittman Construction  
 Co. Inc.  
 Freese and Nichols Inc.  
 Gallant Builders  
 Galaxy Builders  
 GAMMA Construction  
 Gambit Construction  
 Gilbane Building Company  
 Grand Homes  
 Granite Construction  
 Gray Mechanical  
 Greater Austin Development  
 (AGADCO)  
 Greater Metroplex Interiors Inc  
 (GMI)

Greystar Real Estate Partners  
 H&S Constructors Inc.  
 Hanover Company  
 Harvey-Cleary Builders  
 Haskell Corporation  
 H-E-B Grocery  
 Hensel Phelps Construction Co.  
 Herman & Kittle Properties Inc.  
 Highland Homes  
 Hill & Wilkinson General  
 Contractors  
 Hillwood Construction Services  
 Hines Interests LLP  
 History Maker Homes  
 HITT Contracting Inc.  
 Hoar Construction LLC  
 Holder Construction  
 IE2 Construction Inc.  
 Imperial Construction Inc.  
 Integrity Group  
 ISEC  
 J.D. Abrams  
 Jacobs Engineering Group  
 James Construction Group  
 JBKnowledge  
 JE Dunn Construction  
 Joeris General Contractors  
 Jordan Foster Construction  
 Joslin Construction  
 JPI Construction  
 Karsten Interior Services  
 Katerra  
 KBR  
 KHS&S Contractors  
 Kiewit  
 Kilgore Industries



King of Texas Roofing  
 Kitchell Contractors  
 Ledcor Group  
 Legends Project Development  
 Lendlease  
 Lennar Corporation  
 Linbeck Group LLC  
 Long Lake Ltd.  
 LP Corporation  
 M/I Homes  
 Manhattan Construction Co.  
 Marek Brothers  
 Martin Marietta  
 McCarthy Building Companies Inc.  
 McGough  
 MEDCO Construction LLC  
 Meritage Homes  
 MIn Company  
 MMC Corp  
 Mortenson Construction  
 Moss & Associates  
 Muckleroy & Falls  
 MW Builders  
 MYCON General Contractors  
 National Property Holdings  
 Noble Texas Builders  
 Northstar Builders Group LLC  
 O'Donnell Snider  
 ONCOR Electric Delivery  
 Opifex  
 Orion Marine Group Inc.  
 Osburn Contractors  
 Paradigm Consultants  
 Peckar & Abramson  
 Performance Contracting Inc.  
 Perry Homes

Phillips and Jordan  
 Pinnacle Construction Group  
 Pogue Construction  
 Polk Mechanical Company  
 Prim Construction  
 Prime Controls LP  
 PulteGroup  
 R.K. Hall LLC  
 Ranger Specialized Glass Inc.  
 Renewable Energy Systems Americas Inc.  
 Ridgemont Commercial Construction  
 RMC Group LLC  
 Robins & Morton  
 Robinson General Contractors  
 Rogers O'Brien  
 Rosenberger Construction  
 Rosendin Electric  
 RSI Communities  
 Ruppert Landscape  
 Russell Marine LLC  
 Ryan Companies  
 S. Watts Group  
 Saratoga Homes  
 Satterfield & Pontikes Construction Inc.  
 Schulte Roofing  
 Scott & Reid General Contractors  
 Sebastian Construction Group  
 Sevan Multi-Site Solutions LLC  
 Sims Luxury Builders  
 Skanska USA Building Inc.  
 Slate Construction  
 Southwestern Services  
 SpawGlass

Spring Valley Construction Company  
 SteelFab Texas Inc.  
 Steve Hoegger & Associates  
 Strategic Construction LTD  
 Streetlights Residential  
 Structura Inc.  
 Structure Tone Southwest Inc.  
 Summit Materials  
 SUNDT Construction Inc.  
 Swinerton Builders  
 TDIndustries  
 Teal Construction  
 Tellepsen Builders Inc.  
 The Beck Group  
 The Brandt Companies  
 The Burt Group Inc.  
 The Dinerstein Companies  
 The Lemoine Company  
 The NRP Group  
 The Porter company  
 The Rhodes Group  
 The Williams Companies  
 Thompson Custom Homes  
 Tipler Design and Build  
 Toll Brothers Inc.  
 Total Facility Solutions  
 Trammell Crow Residential  
 Triflection Remodeling & Construction  
 Trio Electric  
 Turner & Townsend  
 Turner Construction Company  
 Turner Industries  
 Tx Morrow Construction  
 UDR Inc.  
 UEB Builders Inc.

US Army Corps of Engineers  
 US Trinity Energy Services LLC  
 Vaughn Construction  
 VCC LLC  
 W.S. Bellows Construction Corporation  
 WBW Construction LLC  
 Webber LLC  
 Weis Builders Inc.  
 Western Specialty Contractors  
 Williams Companies  
 White Construction Company  
 Whiting-Turner Contracting Company  
 Zachry Construction Corporation  
 Zero/Six Consulting LLC

## EMERITUS MEMBERS

Jesse Gonzales  
 Don Jones  
 Jim Marsh  
 Jack Morris  
 Duane Pozza  
 Jack Turner  
 Joe Vaughn

## LIFETIME (INDIVIDUAL) MEMBERS

Dwain Bankston  
 Don Baumann  
 Martin Benjamin  
 Ben Bigelow  
 Gary Boldt  
 Shane Boscamp  
 Kyle Cook  
 William Keith Ellis '88

# CIAC MEMBERS

Edelmiro Escamilla '00, Ph.D

George Eustace

Larry Fickel

Jim Garcia

Michael Garrett

Todd Grigsby

Jeff Hagar

Todd Handwerk '83

Thomas Hill

Bryan Holmes

Joe Horlen

Donald Hubert '68

William Bill Johnson

Russell Jones

Brian Lewis

Stephani Luebben '18

Lendon Lewis

Benjamin Martin

Richard McCord

Gavin McGee

David McLendon

Corbett Nichter

Michael Ogden

Tom Owens

Richard Palmer

Neil Platt

J.R. Richardson

Robert Rayborn

John R. (Bo) Richardson

Timothy Ross

Robert Schmidt

Elliott Shepherd

Hugh Smith '79

Geritt Smith '13

Gordon Stewart

Patrick Suermann '03

Clark Teel

Paul Torres '99

Tom Tribble

Blake Vacek '02

Robert Van Cleave

Don Weaver

Mathew Williamson

Larry Zuber

## ASSOCIATE MEMBERS

Charlene Anthony – AGC  
Houston

Toby Cummings

Russell Hamley – ABC Houston

Mike Holland

Jerry Nevlund – AGC Houston

Raymond Risk, Jr.

Dave Sanchez

Raleigh Roussell

Daniel Sanchez

Bart Surratt

Timothy Adams

Tammy Betancourt, CAE

Teresa Foster

## 2018-2019 ANNUAL MEMBERS

Christopher McMilliam '07

Jim Russ

Steven Solka

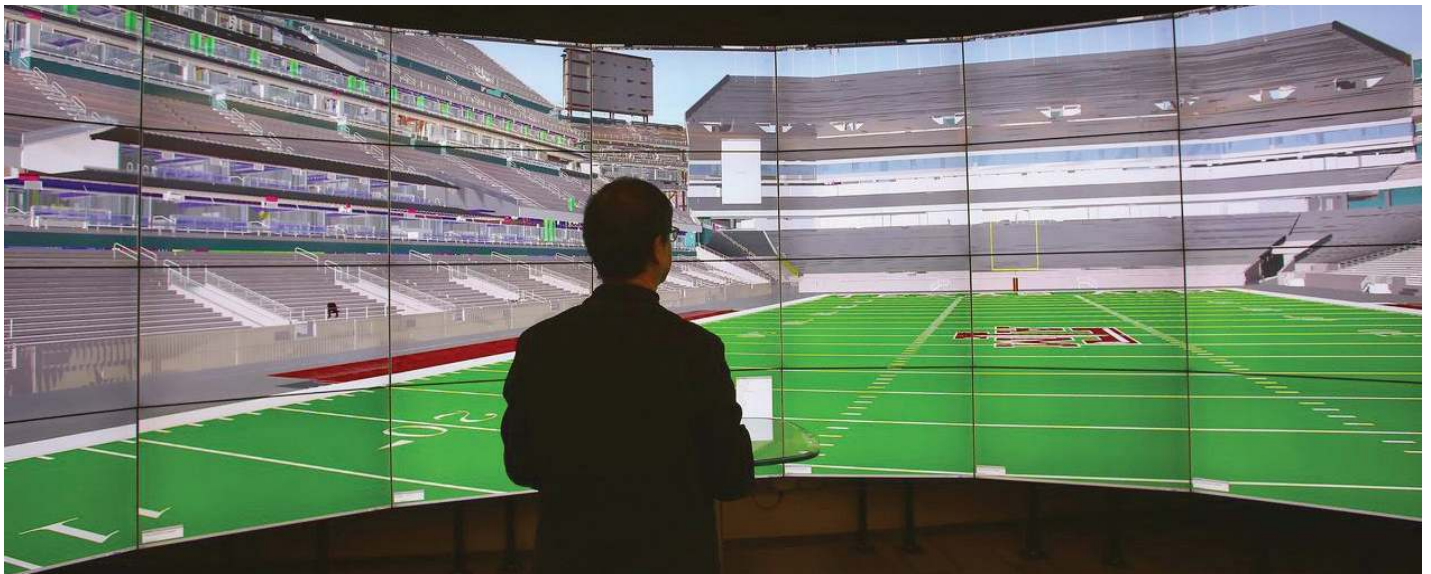
James Davis

Lisa Buck

Don Baumann Jr '82

Byron Weaver







## HIRING DATA

Points Possible Criteria Summary of employment for 2018–19 Bachelor of Science Construction Science graduates.				
	SPRING 2018	SUMMER 2018	FALL 2018	TOTAL
NUMBER OF GRADUATES	135	69	104	308
NUMBER PROVIDING DATA	119	60	99	278
STARTING BASE SALARY *				
Maximum	\$ 89,500	\$ 77,200	\$ 99,000	\$ 95,000
Average	\$ 61,333	\$ 63,130	\$ 63,037	\$ 62,500
Minimum	\$ 48,000	\$ 57,500	\$ 46,000	\$ 46,000

	SPRING 2019	SUMMER 2019	FALL 2019	TOTAL
NUMBER OF GRADUATES	143	49	110	302
NUMBER PROVIDING DATA	137	49	102	288
STARTING BASE SALARY*				
Maximum	\$ 99,000	\$ 75,000	\$ 104,000	\$ 104,000
Average	\$ 63,429	\$ 63,222	\$ 64,809	\$ 63,708
Minimum	\$ 50,000	\$ 54,080	\$ 50,000	\$ 50,000

\* Information on starting salaries for all majors within the College of Architecture (and everyone else) at Texas A&M University is available at: <https://aggiesurveys.tamu.edu/public/Reports.aspx>

Construction Industry Advisory Council Approved Budgets for 2018 and 2019

## 2018 CIAC BUDGET

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Retained Earnings (01/01/18)	\$250,708
2017 Carry Over from CIAC Support Fund 57851	\$28,525
Income	
Corporate Membership Dues	\$450,000
Individual Membership Dues	\$3,200
Interest from CIAC Support Fund (\$1217/mo)	\$14,580
Total Income	\$467,780
Total Available Funds	\$747,013

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## Expenses

Graduation Event	\$10,000
Annual Banquet	\$22,000
Research Studies	\$25,000
Individual Scholarship & Student Recruitment	\$20,000
Endowed Matching Scholarships	\$120,000
Program Enhancement	\$60,000
Endowed Professorship	\$20,000
Matching Endowed Leadership Minor	\$50,000
CIAC Meeting Expense	\$20,000
CIAC Endowment - CIAC Support Fund	\$150,000
Former Student Members Promo - Tailgate	\$5,000
Career Fair	\$0
Development Fee & Credit Card Collection Fee	\$22,660
Total Expenses	\$524,660
Balance	\$222,353

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# 2019 CIAC BUDGET

## 2019 CIAC BUDGET

Retained Earnings (01/01/19)	\$208,336
2018 Carry Over from CIAC Support Fund 57851	\$43,105
Income	
Corporate Membership Dues	\$450,000
Individual Membership Dues	\$2,000
Interest from CIAC Support Fund (\$2171/mo)	\$26,052
Additional Funds from CIAC Career Fair	
Additional Funds from Non CIAC Career Fair	
Total Income	\$478,052
Total Available Funds	\$729,493
Expenses	Budget
Student Enrichment (BUILD)	\$25,000.00
Graduation Event	\$10,000.00
Annual Banquet	\$22,000.00
Research Studies	\$25,000.00
Individual Scholarship & Student Recruitment	\$20,000.00
Endowed Matching Scholarships	\$120,000.00
Program Enhancement	\$60,000.00
Endowed Professorship	\$20,000.00
Matching Endowed Leadership Minor	\$50,000.00
CIAC Meeting Expense	\$25,000.00
CIAC Career Fair	\$30,000.00
CIAC Endowment - CIAC Support Fund	\$95,000.00
CIAC Department Enrichment - Francis Maintenance	\$55,000.00
Former Student Members Promo - Tailgate	\$5,000.00
Development Fee & Credit Card Collection Fee	\$22,600.00
Total Expenses	\$584,600
Balance	\$144,893







TEXAS A&M UNIVERSITY  
Construction Science

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