ENGINEERING:
TODAY & TOMORROW

WINTER/SPRING 2021

THE POWER OF COMMUNITY

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by LIAISON

Engineers Will Do What Needs to Be Done

The changing dynamics of higher education and the world are testing our ability to adjust appropriately to our new realities and constraints. The Army's VUCA acronym (Volatile, Uncertain, Complex and Ambiguous) probably best describes our new work environment. However, I believe our community of enrollment management professionals will destroy our previous silos and collaborate to meet and exceed our new charge. By reshaping our communities of practice, we will gain a fresh and different perspective, which will enable innovative ways to execute the elements of the enrollment lifecycle.

One way we're already doing that is by using EngineeringCAS™ — the first and only Centralized Application Service (CAS™) for graduate engineering programs — to improve the applicant experience for students and to share our own insights and best practices with our colleagues.

To continue making this happen, we must foster meaningful conversations with the entire spectrum of graduate engineering education stakeholders, including students, employers, faculty, staff and other partners. Our success will be predicated on our ability to listen and to create a voice that speaks equally for everyone.

The strategic path forward is not well defined, but I believe it must be characterized by fundamental elements that originate from servant leadership and intentional diversification for the strategy to have a lasting impact. Keep this paraphrased quote from Patrick Lencioni in mind as we move outside of our comfort zones to meet students where they are: "*[Students] are going to remember what we did and said as [academic] leaders during these times — [students] are watching us and holding us more accountable like never before.*"

So, let's roll up our sleeves, set aside our preferences and build indelible academic experiences for our engineering graduate students. Together our collective wisdom can derive the robust changes needed to facilitate positive academic futures.

With that in mind, the theme of this issue of *Engineering: Today & Tomorrow* is "The Power of Community," which I believe is both timely and appropriate. Among other things, the following articles explain how Texas A&M learned to make quicker and more strategic admission decisions, how joining the EngineeringCAS Community benefits engineering institutions and why we recently decided to form our new EngineeringCAS External Advisory Board on Diversity, Equity and Inclusion (DEI).

Our editorial team would love to hear your feedback about this issue of the magazine and any suggestions you may have for future issues. They can be reached at editorial@liaisonedu.com.

Enjoy,

Craig G Downing, Ph.D.
Associate Dean of Lifelong Learning Department Head and Professor of Engineering Management Rose-Hulman Institute of Technology
Chair of the EngineeringCAS Advisory Board

In This Issue
WINTER/SPRING 2021

ENGINEERING:
TODAY & TOMORROW

GETTING BETTER DATA FASTER:

HOW TEXAS A&M ACHIEVES KEY GOALS
WITH ANALYTICS BY LIAISON

TEXAS A&M UNIVERSITY
Engineering

by Tandilyn Morrel
Director of Graduate Programs

Texas A&M University College of Engineering joined EngineeringCAS in the fall of 2019 after looking for an application platform that offered an enhanced experience to our applicants. We also wanted to be able to provide our admissions staff, graduate advisors and faculty the data they needed to make quicker and more strategic admissions decisions in order to meet our enrollment goals. By joining EngineeringCAS — and by gaining access to Analytics by Liaison™ — we met those needs.

Analytics presents data visually in charts, tables and other formats which you can easily customize based on a variety of filters, including applicant demographics, residency, citizenship, application progress and academic history.

Regardless of the time period or filters you review, Analytics gives you a granular overview of how your applicants may be changing over time. At Texas A&M, being able to drill down into each graduate program's data has assisted us tremendously in evaluating whether our holistic admissions processes are working properly.

We also like the ability to download reports in a number of different file formats and import them into presentations. It makes it easy for us to share important data with other departments and individuals across campus. For example, we can see exactly which counties in Texas our applicants are coming from. That, in turn, allows us to streamline our recruiting resources and determine how to best use them in the future.

Another nice feature of Analytics by Liaison is that you're able to reach out to specific applicants, such as those who have not completed an application, and communicate with them directly. Prior to joining EngineeringCAS, we could not do that. We did not know who those applicants were. Now we can reach out to them directly, either to help them complete the application or to recruit them into the program.

Analytics also provides a very easy way to gather data for fulfilling state and national survey requests, compiling annual reports and assisting with analyses of outcomes. It's great for faculty because it allows them to quickly obtain important data about applicants, as well as data they need to apply for and retain grants.

Prior to joining EngineeringCAS and using Analytics, we had to submit data requests to an accountability office on campus. It could take several weeks before we heard back, and the data we received was not always in the format we needed. Joining the CAS has been a real game changer for us. We are now able to instantaneously find data and provide it to others on campus who need it. Across the board, this has increased transparency and helped us make better decisions.

In the short time we have been part of the EngineeringCAS community, we have seen a 5% increase in completed applications. I can say with confidence that Texas A&M is very pleased with the results we have achieved by joining EngineeringCAS and using Analytics to move forward in our admissions processes as we strategically build our cohorts. ∎

> " Prior to joining EngineeringCAS and using Analytics, we had to submit data requests to an accountability office on campus. It could take several weeks before we heard back, and the data we received was not always in the format we needed. Joining the CAS has been a real game changer for us. We are now able to instantaneously find data and provide it to others on campus who need it. Across the board, this has increased transparency and helped us make better decisions."

Tandilyn Morrel
Director of Graduate Programs

TEXAS A&M UNIVERSITY
Engineering

AND THE WINNERS ARE...

Results of the ASEE EngineeringCAS Student Video Contest

ASEE
AMERICAN SOCIETY FOR
ENGINEERING EDUCATION

If you care about today's engineering students and how they envision the future, you'll want to watch the winning entries of the second annual ASEE EngineeringCAS Student Video Contest. Sponsored by the American Society for Engineering Education (ASEE) and Liaison, this year's contest — focused on the theme "Engineering Careers & YOU!"— inspired so many great entries we actually had a tie for first and second place.

1ST PLACE (TIE)

Click each screen to watch the winning videos!
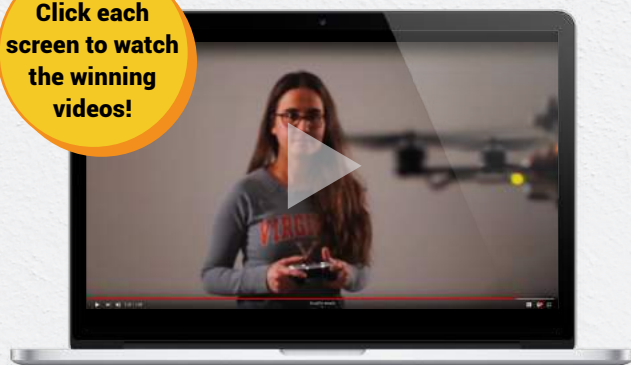
"Why I Engineer"
Navya Annapareddy
University of Virginia

As a child, Navya always loved solving problems, yet she never expected to be an engineer. Discovering coding at age 10 changed how she saw the world, and now she views engineering as a way of using "logic and creativity to make the world better in some tangible way."

"A Degree That Will Transform the World"
Joshua Honorat
University of Florida

Joshua describes how joining his high school robotics team gave him insight into what engineering means to him and how it put him on the path to become the first engineer in his family.

2ND PLACE (TIE)

"2 Guys, 1 Car, No Engine"
**Matthew Draws and Jun Seo**
York University

Matthew and Jun describe how their engineering education provided the fundamental skills they needed — creativity, perseverance, critical thinking and theoretical knowledge — to successfully convert a gas-powered car into a battery-operated vehicle.

"Engineering Education for Developing Countries"
Collins Vaye
Florida International University

Collins explains how his desire to find solutions to societal problems in his native Liberia motivates him to advocate for enhanced STEM education there as he works toward his goal of earning a Ph.D. and becoming an engineering educator.

3RD PLACE
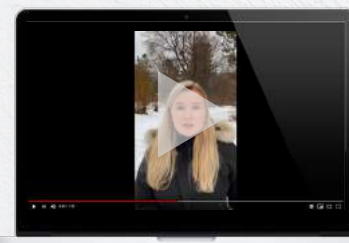
"Kinetically Charging My Future"
Alicia Hill-Turner
University of Toronto

Getting stranded at a snowy bus stop late at night after the battery on her cell phone died inspired Alicia to create a cell phone case that converts kinetic energy to electric energy. Now her cell phone charges itself whenever she moves.

RUNNER-UP ENTRIES

"Why I Went for Engineering Even When My Parents Didn't Force Me To"
Zara Akkuly
University of Toledo

"Why I Fell in Love with Space Engineering"
Adam Boro
University of Maryland

"Why I Want to Be an Engineer"
Noah D'Emilio
University of Toronto

"ASEE Video Contest"
Abdulai Kargbo
University of Toledo

"Five Years of WIAA at the University of Maryland"
Women in Aeronautics and Astronautics (WIAA)
University of Maryland

Meet the EngineeringCAS Advisory Board

Natacha DePaola, Ph.D.
Professor of Biomedical Engineering

ILLINOIS INSTITUTE OF TECHNOLOGY

The EngineeringCAS Advisory Board is composed of engineering education leaders from campuses and professional associations across the U.S. Together, they work to provide strategic direction to engineering educators and to drive the vision for EngineeringCAS, the Centralized Application Service (CAS) for engineering programs. Board members focus on innovation and collaboration with the Liaison team and serve as Liaison's connection to the greater engineering community. In this regularly occurring feature, *Engineering: Today & Tomorrow* introduces you to a different member of the EngineeringCAS Advisory Board each issue.

Dr. DePaola is a professor of Biomedical Engineering and the former Dean of Engineering at Illinois Institute of Technology. She has over three decades of combined experience in biomedical engineering research, education and academic leadership. Dr. DePaola is committed to excellence in engineering education and the empowerment of a diverse and agile workforce to succeed in today's rapidly changing technologically driven industry and society. She has received various awards and recognitions, is a fellow of the American Institute for Medical and Biological Engineering (AIMBE), is a member of eight other professional societies and serves/has served in various public and private (academic and non-academic) advisory committees and boards. Dr. DePaola is the founder and current Director of the Illinois Tech Digital Medical Engineering & Technology Research and Education Center (IDMET), which focuses on the development of educational solutions and the application of advanced digital tools in biomedical engineering research.

Get to know the Board in our

ENGINEERING: TODAY & TOMORROW

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Join Your Colleagues in the EngineeringCAS Community

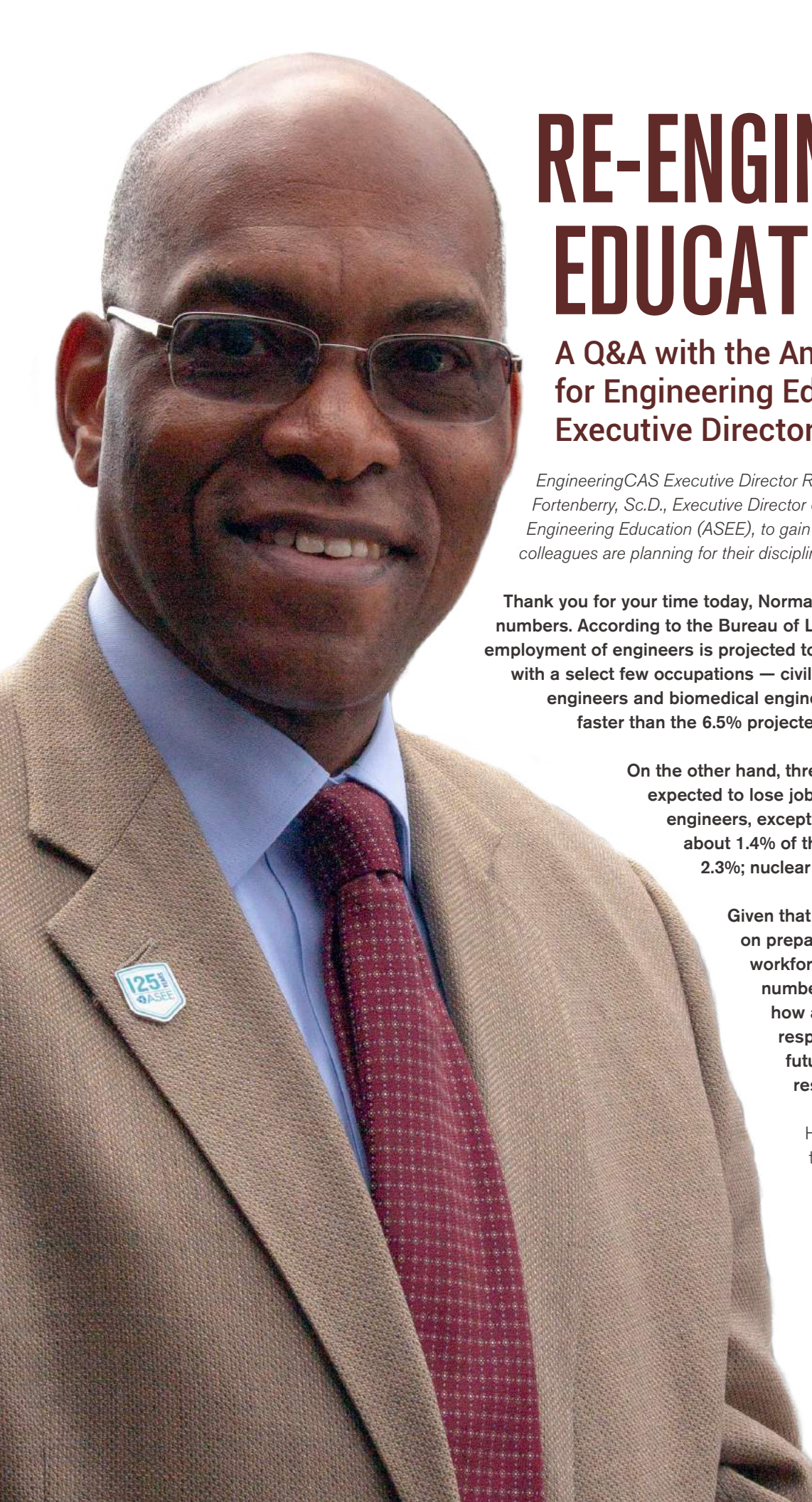Connect with Ron Hyman, Executive Director of EngineeringCAS, to join today at drift.me/ronhyman

ENGINEERINGCAS by LIAISON

Are you eager to share your views on graduate engineering education with your peers? Contribute to our next issue!

Contact our editorial team at editorial@liaisonedu.com to pitch your idea. The theme of the next issue will be "**Doing More With More**" and we welcome your submissions.

RE-ENGINEERING EDUCATION:

A Q&A with the American Society for Engineering Education's Executive Director

EngineeringCAS Executive Director Ron Hyman sat down with Norman Fortenberry, Sc.D., Executive Director of the American Society for Engineering Education (ASEE), to gain his insights into how he and his colleagues are planning for their discipline's future.

Thank you for your time today, Norman! I'd like to start with the numbers. According to the Bureau of Labor Statistics, the overall employment of engineers is projected to grow 4.0% from 2014 to 2024, with a select few occupations — civil engineers, environmental engineers and biomedical engineers, specifically — growing even faster than the 6.5% projected rate for all occupations.[1]

On the other hand, three engineering occupations are expected to lose jobs during this decade: electronics engineers, except computer, are projected to lose about 1.4% of their jobs; aerospace engineers, 2.3%; nuclear engineers, 4.0%.

Given that your association focuses on preparing future engineers for the workforce, what do you read into these numbers? What trends do you see, and how are you and the other leaders responsible for planning for the future of engineering education responding to them?

Honestly, I don't spend a lot of time thinking about the numbers. The way I see it, any student should seek work that they find interesting and challenging — there will always be cycles where there is greater or lesser employment in one area or another. Fortunately for our industry, a well-educated engineer has the flexibility to shift to another closely related area if their particular specialty faces a lack of demand.

Most fundamentally, what numbers of this type tell me is there's growing recognition of the importance of being able to work at the interface of disciplines. Interdisciplinary and multidisciplinary work is critical. We need to work with people from different disciplines in order to get jobs done, and it's important that we prioritize lifelong learning as our world evolves and changes.

There's an old saying, "Universities have departments — nature does not." Outside of academia, we're always working across disciplines to solve real-world problems — that's engineering for you. One sub-discipline is up, and one's down? That doesn't deserve our focus. What we need to prioritize is the quality of preparation, so our students are ready to think critically and address novel problems as they deliver solutions that serve human needs.

Overall, do you feel engineering education is focusing on "the right things"? Do you believe it's fostering a love of lifelong learning?

I do. Over my three decades in this discipline, there's been work on engineering curricula to eliminate the dichotomy between hands-on and theoretical learning, to find a balance between hands-on and minds-on. We recognize that engineers don't work in isolation and that real-world problems require us to be able to engage with the *real world*.

Engineers solve human problems. To do that, you've got to understand the ways humans are struggling. We're not isolated techies off in a corner; we are engaged with the world, and our curricula are beginning to reflect that.

There's a strong emphasis on fundamental knowledge, but once that is established, there must also be interaction with other disciplines. Applications go beyond a single discipline, therefore the abilities to work in teams and communicate across disciplines are increasingly critical. That's what industry tells us, and that's what's guiding our curricula moving forward.

That's a great transition to my next question because I'm interested to hear your perspective on how technology shifts drive change in education.

Specifically, studies like Stanford's One Hundred Year Study on Artificial Intelligence (AI 100) suggest that artificial intelligence (AI) does not pose an imminent threat to workers, yet many engineers still fear that their jobs could soon be taken over by advanced robots. It's understandable when you consider that many of the world's major players are participating in the race to fund such technological advances, including France, where President Emmanuel Macron has pledged $1.5 billion to put his country at the forefront of AI research; the U.S., which requested $110 million to invest in AI in its military's fiscal 2019 budget request; and China, with its three-step development plan and overarching goal to lead the AI industry by 2030. [2][3][4]

What do technological advances like AI mean for the future of engineering education, Norman?

More so than just reacting to change, I think we recognize there are a variety of new and powerful tools available now — in fact, engineers have created some of those tools. So, as a new tool comes along, the engineer thinks, "How do I use this tool to accomplish my objective?" When we went from the slide rule to the calculator, we didn't say, "This is a major change in technology." We said this is a better tool that allows us to do analysis more quickly. Now, we've got to have confidence in this black box calculator or this computer. Once you have confidence in the processes of the tool, you can use it to tackle more complex problems. That's the way we view AI: It's just another tool to solve ever more complex problems.

What other technology trends are you tracking? Are there any other tools like AI that have caught your eye?

AI is a major change — that's why you've heard all of these references to "Industry 4.0," with steam being 1.0, followed by mechanical and then electrical power. It's a major advance that opens the door to blending the constructed world with the biological world. I'm not going to diminish that — it is a major advance, but it is a tool. Do we see anything else like that on the horizon? Not at that level.

When I'm thinking on that level, I think of the internet, especially because it has helped our world make great strides towards becoming more connected. Still, we've struggled with wealth gaps that separate those who have access to technology and those who do not.

Developments like blockchain have given global leaders confidence that we may be able to address this accessibility issue and truly connect people across geographic borders to more opportunities. If we do continue to work toward what the World Economic Forum's Global Future Council on Blockchain deems a "new era of globalism," what will this increased connectivity mean for engineering education? [5]

We have to take extra care to make sure those communication skills I mentioned before are not only dealing with different disciplines, but with different cultures across boundaries and borders as well! We're working on projects now in which design drawings begin in Singapore; then the drawings travel to Japan, then the United States and then production starts in Germany, so being on the same page about what's happening every step of the way is crucial.

I'm thinking of an example — a very large-scale one, at that— and I don't remember it in great detail, but it had to do with a NASA craft the U.S. was working on with another country. Ultimately the craft couldn't connect to the Space Station because the Space Station used the metric system, and we used different units of measure! It seems like a small thing, but when you're talking about a spacecraft, that's millions of dollars in both materials and personnel time rendered useless because nobody communicated what the proper units were.

That's a trivial example — units — but it illustrates the importance of communication across cultures. Similarly, fighting the California wildfires, there have been radio interviews with people from Australia and New Zealand who have come over to the U.S. to help. In the first interview I listened to, one of the speakers said, "You know, in Australia, when we talk about a tanker, we mean a big truck on wheels — it carries fluid. When American firefighters say, 'I need a tanker,' they mean an airplane." So, if you say, "I need a tanker, and I need it now," you get a very different thing depending on who you're talking to if you don't understand the cultural context.

What I'm talking about here is not only good engineering practice but good communications practice as well.

It's clear that appreciation for, and an understanding of diverse perspectives is important and will continue to be important moving forward, yet we do still face a somewhat homogenized engineering workforce. In fact, the National Science Foundation found that African Americans comprised 2.6% of the engineering workforce in 2014, while Hispanics constituted 6.6% and women accounted for 14.8%. Because low minority workforce participation in STEM is driven by low numbers of underrepresented populations pursuing degrees in these fields, how does graduate engineering education need to change in order to meet the goal of building a more diverse workforce? [6]

First and foremost, we need to work on retention. Across the board, engineering nationally has around a 40% attrition rate — 40% of the students who start do not finish. That's counting those who were admitted into an engineering program. Let's be clear that these are not weak students. We have data going all the way back to 1997's *Talking About Leaving: Why Undergraduates Leave the Sciences* stating that a number of students leave science and engineering fields not

because they can't hack the work but because they're not properly instructed. We need to first and foremost retain those students who have already expressed an interest, taken the time to enroll and found their way to our classrooms.

Concurrently with doing that, we need to engage younger students by having proper role models at the pre-college and collegiate levels. This is one of a large number of components to keep in mind as we work on building welcoming environments, understanding that students have choices when it comes to their education and their career paths, and they won't hesitate to vote with their feet. Engineering and science, in general, used to be in a position in which faculty took pride in being the weed-out or filter courses: "Look to your left, look to your right — only one of you will be here in three years…" We don't have that luxury anymore. Engineering's career satisfaction and compensation rates have to compete with those of other satisfying career fields for very bright students.

So, we need to compete, we need to explain to students the attractions of an engineering career and we need to move away from harping on how hard this is as a field. You don't see people talking to future doctors saying, "You're going to spend a lot of time memorizing gross anatomy and dissecting things and trying to memorize all the parts." They say, "You're going to save lives." The average doctor or surgeon treats one person at a time. An engineer creates a system, a product, a process that affects *hundreds* of lives at one time. If an airplane goes down or a building implodes, there are a lot of lives at stake.

The quality of human life is directly tied to engineering. If you look at everything that is not growing on a tree — and even some things that *are* growing on trees— they're the result of engineering. We need to communicate that message to potential students better. Demographics are telling us that's particularly important for women and underrepresented minorities, but many white males are looking for relevance in

what they do as well. We have to explain the human relevance of engineering as a profession if we are to attract and retain more students.

Related to doing this important work, ASEE was one of the first engineering societies to partner with Liaison on EngineeringCAS, the Centralized Application Service (CAS) for graduate engineering programs. In previous interviews, you've offered insight into why you see participating in this initiative as valuable for your members, with one particular reason being that those who participate in the CAS can collaborate closely with colleagues, sharing best practices and implementing new ideas.

Can you share more about some of the other projects and initiatives that ASEE is currently undertaking to help its members work together for the benefit of the engineering field as a whole?

As a society, ASEE places a strong emphasis on broadening participation and diversity. For the past several years, we have had sessions at our annual meeting, write-ups in our magazine and activities at our section meetings focused on building a more inclusive environment for women, minorities and members of the LGBTQ+ community. We haven't done as good a job as we should concerning people with disabilities, but we recognize we need to do more there as well. That's the society overall.

We've done Safe Zone workshops for LGBTQ+ community members, and the engineering deans have something called the Deans Diversity Initiative, which is looking at building a more inclusive pre-college pipeline for women and minorities, strengthening the retention of those populations at the undergraduate level and encouraging students in those groups to go on to graduate degrees. That's part of where EngineeringCAS comes in. We want to have a more diverse professoriate, both for role models and viewpoints for

problem-solving, and we're working on a major gender equity initiative for women faculty that we hope to be starting in the next few months.

We're also continuing with efforts like our National Effective Teaching Institute. If we get faculty in the classroom, they should know the research that informs effective teaching and how to implement that research base. We're trying to get that information out, so time spent in classrooms is as effective as possible. Overall, we're taking a more holistic view of engineering faculty, whether that means considering their unique backgrounds or keeping in mind their work as researchers and also as higher-level administrators: chairs, deans, etc. People no longer have the luxury they had in the 1950s. The stereotypical engineer, whether in industry or academe, was male, living in a traditional household with someone else who took care of running that household. Now, engineers live in two-career households — they have issues with child care, elder care. They're stretched

thin, so they need to be as effective as possible across a broad spectrum of their professional life — and their personal life, but that's a bit outside our purview.

What we're trying to do as a society is transmit the message that ASEE makes you more effective, and we do that by providing guidance and education, whether you are a new faculty member, a student counselor, a dean, a chair or a corporate recruiter. Across the board, if you are a member of ASEE, we're here to make you more effective at your job.

Thank you so much for your time, Norman. It's been great hearing your perspective. Is there anything else you'd like to add or emphasize before we wrap up?

I want to emphasize the point you made about being in a connected world. Increasingly, we need to think globally. We need to recognize that there's very little that is truly someone else's problem. Take the example of air pollution —

We recognize now that air pollution travels on the jet stream, so if we don't solve air pollution in a number of places, then we still have a problem that needs to be solved. It's even more critical with the way we treat our water. Planetary-scale issues that we may try to treat as local or national problems are really global problems. As the saying goes, we need to think globally but act locally because we're all connected. Engineering is central to both recognizing that connectivity and addressing problems systematically, so we can all have a better future. ∎

[1] lsnedu.com/USBLS-Eng-Outlook-2024
[2] lsnedu.com/AI100-stanford
[3] lsnedu.com/Macron-AI-pledge
[4] lsnedu.com/China-drives-US-AI
[5] lsnedu.com/WEF-blockchain
[6] lsnedu.com/diversify-STEM-workforce
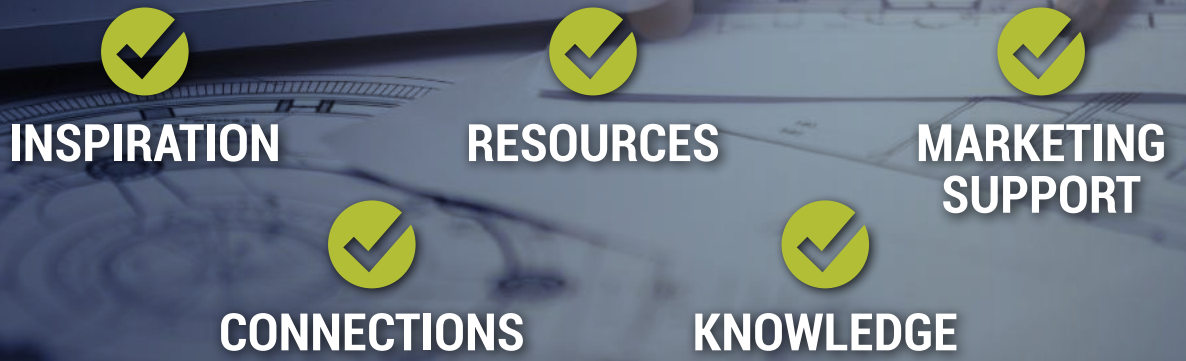
ENGINEERING**CAS**™
by **LIAISON**

A Community Unlike Any Other in the World of Graduate Engineering Admissions

This is no time for graduate engineering programs to be stuck in the past. Even before COVID-19 closed borders and shut down campuses, it was clear that new strategies would be required to increase domestic applications and keep international pipelines open.

EngineeringCAS, the first and only Centralized Application Service (CAS) for graduate engineering programs, lets you do that — without working harder or spending more money.

"The best way to meet the needs of today's reality is by partnering, creating communities and sharing best practices," said Liaison's Client Delivery Manager Jillian Baer, a former engineering admissions professional herself. "That's what we do at Liaison. We bring members of the EngineeringCAS community together to learn from schools that are doing it right. We leverage that collaborative spirit to make sure that all of our graduate programs succeed and students can get the education they're looking for."

EngineeringCAS is a cloud-based recruiting and admissions solution that provides resources and community for graduate engineering institutions, programs and associations looking to grow and shape enrollment while reducing overall effort and costs. EngineeringCAS is a full-service, web-based marketing and application platform that allows students to apply to as many programs at as many participating institutions as they'd like by submitting only a single set of application materials.

Here are four immediate benefits you'll gain from joining the EngineeringCAS community.

Benefit #1: EngineeringCAS offers high value at no cost to your institution

When you join the EngineeringCAS community, your institution will receive a wide array of benefits at no cost, including:

Test score and foreign credential evaluation: Through partnerships with virtually every global testing provider and transcript authority, Liaison streamlines the integration of official test scores and foreign credentials with your application data.

Applicant support: Liaison handles EngineeringCAS applicant support, leaving the recruiting to you.

Outsourcing of administrative tasks: Liaison physically receives and scans transcripts, relieving your staff of that time-consuming

burden. Your admissions office can then make decisions earlier in the cycle, beating competitors with offers to applicants and reclaiming time to focus on enrolling the right students.

Analytics: Cutting-edge reporting and analytics tools enable you to conduct trend analyses for benchmarking and forecasting purposes, providing you with the insight you need and the ability to compare your results to the cohort of participating colleges.

The power of community: EngineeringCAS connects you with peers from other institutions who are also working toward universally important goals regarding engineering admissions, education and professions.

> "Participating in EngineeringCAS brings our programs to the attention of more students around the world than we may have otherwise reached. We can't assume that every student who logs on to a CAS is familiar with the University of Alabama in Huntsville. Once they begin to explore their options, however, they're going to find us and the programs that interest them."
>
> DAVID BERKOWITZ, Ph.D.
> *Dean of the Graduate School,*
> *Professor in the Marketing Department*
>
> **UAH** THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Benefit #2: Admissions services ensure business continuity for admissions offices

Why do more than 31,000 programs at over 1,000 campuses use Liaison's admissions technology? The support services offered by a CAS are unparalleled in the admissions space. In the realm of application processing services, Liaison physically receives and scans transcripts, helping schools go paperless. This speeds packaging completion and decision times, allowing your institution to reclaim headcount and focus enrollment efforts on reaching the next level.

By allowing Liaison to perform these back-office tasks, your institution will protect itself from disruptive events and maintain "business-as-usual" admissions operations even if physical campuses must shut down their operations.

When you join our Community, EngineeringCAS becomes your:

Marketing Agency
EngineeringCAS increases your programs' exposure, leverages outsourced marketing expertise and visualizes trends to expand your applicant pool.
- Expand your reach with new visibility in the searchable CAS program directory.
- Drive students to apply and to finish their applications with engaging automation.
- Make data-driven decisions about your messaging for smart next-cycle outreach.

Application Clearinghouse and Support Center
EngineeringCAS combines highly customizable admissions management technology with processing services to streamline the submission and management of applications.
- Increase your productivity by outsourcing administrative admissions tasks.
- Cultivate early matriculant loyalty with a superior application experience that's easier and quicker.
- Protect your admissions assets by digitizing, organizing, centralizing and securing all documents.

Enrollment Think Tank
EngineeringCAS facilitates new collaborations to drive mutual success for all participating schools and applicants.
- Make data-driven decisions and be more strategic using benchmarking and reports.
- Try new approaches while mitigating risk when peers confide in what they have tried.
- Act on industry trends with timely insights from exclusive magazines, ebooks and events.

Virtual IT Department
EngineeringCAS delivers robust, customizable data management tools that save you time, money and IT resources.
- Protect your data with software that adheres to industry-standard security protocols.
- Centralize all information assets with one solution to collect, process, store, integrate and analyze datasets.
- Allocate resources effectively with an intuitive platform that admissions and enrollment staff can manage.

With EngineeringCAS, you can focus on what really matters: recruiting and engaging tomorrow's engineering leaders.

Liaison will even handle applicant support for process questions, leaving the recruiting to you. We respond to questions about progress on the application, whether materials have been received and other questions related to the online application via phone, email or chat. Each year, Liaison processes over two million documents and resolves more than one million calls, chats and emails, serving as an extension of thousands of admissions offices.

EngineeringCAS can also serve as the postal point of contact for an admissions office, collecting and storing all official transcripts indefinitely electronically and in a secure physical facility for up to two admissions cycles.

On top of that, EngineeringCAS's reporting capabilities enable you to conduct trend analyses for benchmarking and forecasting purposes so you no longer need to dig up data and crunch the numbers yourself.

Finally, unlike other admissions tools that would leave you to fend for yourself once you purchase the software, EngineeringCAS provides peace of mind by offering continuous access to Liaison's highly experienced and responsive support staff. Liaison's professionals act as a processing and services team for schools and programs and serve as a U.S.-based support center for applicants.

> "Because we serve a global marketplace, we use EngineeringCAS to increase the number of potential applicants who can see our programs and process their applications. EngineeringCAS allows us to make decisions and respond to students more promptly. That's important."
>
> LORIE LIEBROCK, Ph.D.
> *Dean of Graduate Studies* — NEW MEXICO TECH

Benefit #3: You're stronger as a member of a community

From its earliest days, the pandemic inspired engineering educators to stop thinking of each other as competitors and instead seek out opportunities to share best practices and learn from those facing similar obstacles.

Joining EngineeringCAS means you'll be participating in a community of like-minded admissions professionals who are working toward goals that are similar to yours and facing challenges similar to those you face. EngineeringCAS members regularly convene to share their best practices at in-person and digital networking events, such as Liaison's popular live and on-demand webinars.

Being part of the EngineeringCAS community also increases your program's visibility to potential applicants.

David T. Poole, Director of Admission at University of Miami College of Engineering, is passionate about the CAS platform's benefits for the entire engineering discipline, as well as graduate education as a whole.

"In higher education, the majority of the focus really has been on undergraduate education," he said. "The graduate admission enrollment management community has been completely disjointed. There was nothing bringing that community together. One of the things that really attracted me to Liaison and EngineeringCAS was their ability to build communities within and across disciplines at the graduate level. They bring people together who are working with the same set of challenges, issues and budget constraints to share best practices in terms of how EngineeringCAS can assist both the students and the institution, but also to have a forum to discuss issues, concepts and ideas."

Poole continued, "Many times on the enrollment management side in graduate education, we're working in a vacuum. But the more we work together, the stronger we're going to be as a community of educators and institutions. In the long run, that will only help the students we serve in their education and career preparation."

"It's not just words and charts and technology," Poole said. "Hopefully, people who are exploring the possibility of joining a CAS will see they have partners — regardless of the fact that they may be working at other institutions — who ultimately have the same goal to prepare the best students in their discipline. In CASs, Liaison provides the forum for all students and institutions to use a common platform to reach their goals, and in return to help make the world a better place."

Benefit #4: Marketing your school internationally expands your reach

Participation in a CAS comes with complimentary marketing campaigns focused on driving your prospects to apply or complete their applications.

Each unique CAS also attracts applicants' attention through highly targeted, far-reaching ads on social media channels and regional, national and international outlets, like StudyPortals, the *Financial Times*, Princeton Review and *U.S. News & World Report*. And we know it works — From June to September 2020, 232 new CAS accounts were created by applicants who found their institutions of interest through the institutions' individual .edu sites.

During that same time period, 700 accounts were created by applicants who found out about CAS — and its participating programs — through Liaison's advertising campaigns.

With CAS, you can also use your own data and data pooled from CAS member schools and programs to benchmark against your peers — regionally and nationally. You'll be able to see how well your message is being received and work with Liaison to create more informed marketing plans for improving outreach and yield.

"There is nobody else doing what Liaison is doing right now in terms of their partnerships and marketing pieces. Working with Liaison is like having a combined enrollment and marketing department."

CHRISTOPHER A. SMITH, Ph.D.
Executive Director of Enrollment Management, Marketing and Financial Aid

KANSAS STATE POLYTECHNIC

Contact Liaison today to learn more about how joining the EngineeringCAS Community can help you reach more applicants and build a better class. And please be sure to join our *Engineering: Today & Tomorrow* LinkedIn group at lsnedu.com/ETandT-LinkedIn to stay up to date on the latest news, trends and discussions affecting graduate engineering admissions and education. ∎

Our Partners

There are three types of partnerships associated with EngineeringCAS: engineering societies, institutions and advisory boards.

Liaison has strategic partnerships with many engineering societies. The **American Society for Engineering Education (ASEE)** has embraced the solution and has made EngineeringCAS available to all their member schools as a member benefit. We work closely with ASEE to bring awareness of EngineeringCAS and the many benefits of joining the Community to deans, directors, admissions personnel and faculty. We also have partnered with other engineering societies, like the **American Society of Mechanical Engineers (ASME)**, the **American Society of Agricultural and Biological Engineers (ASABE)**, the **Global Engineering Deans Council (GEDC)** and the **International Federation of Engineering Education Societies (IFEES)** to ensure EngineeringCAS serves all of graduate engineering education's stakeholders.

The partnerships Liaison forms with engineering schools are critical to a successful EngineeringCAS. As more and more schools participate in the CAS, applicants have more choices. We view the relationship we have with each school as a true partnership.

Our advisory boards provide strategic direction for EngineeringCAS. Learn more about these boards on page 8 and page 19 of this magazine.

EVERY VOICE MATTERS:

Introducing the EngineeringCAS Diversity, Equity and Inclusion (DEI) Advisory Board

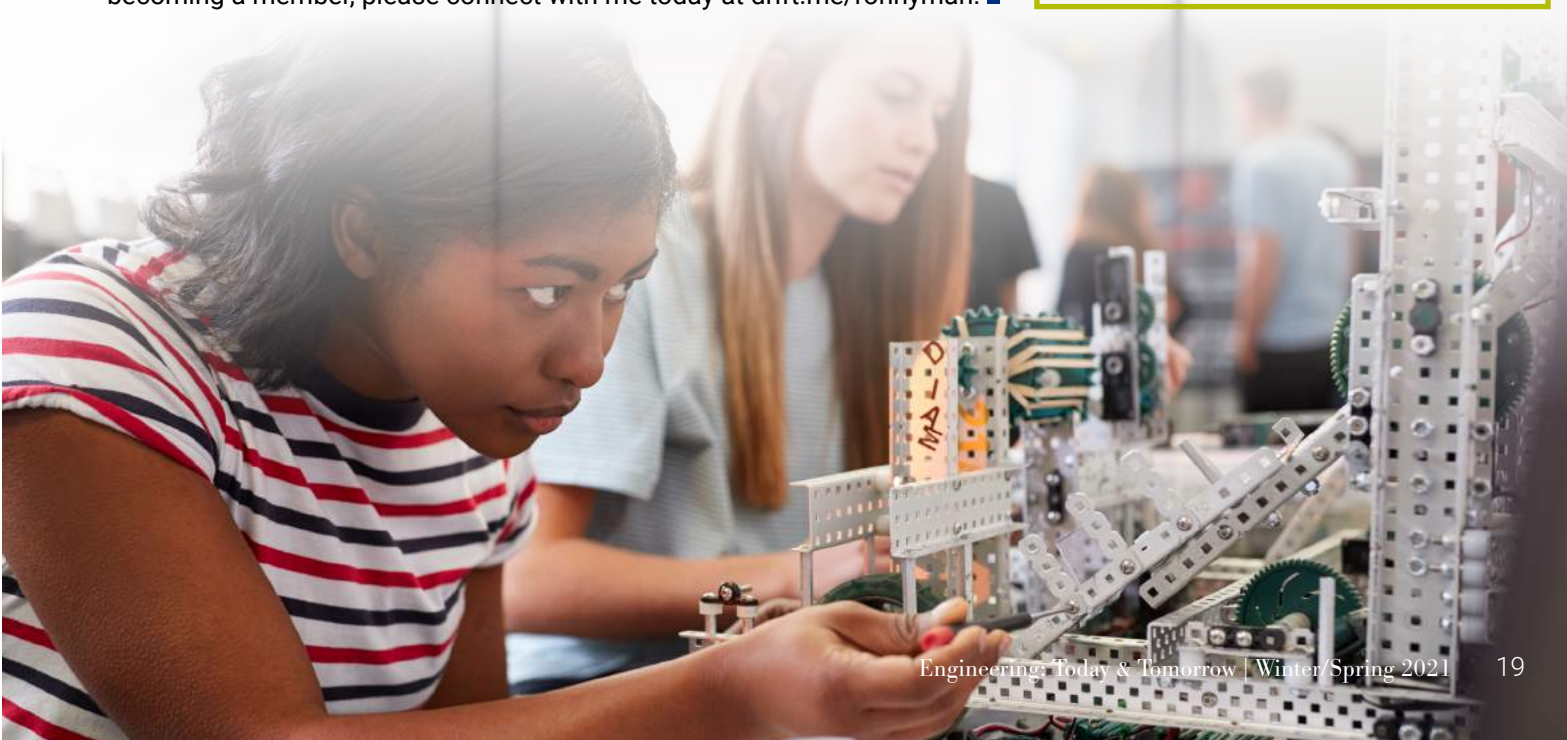**ENGINEERINGCAS** by LIAISON

by Ron Hyman
Executive Director

Whether you listen to admissions professionals from engineering programs throughout the country or watch the evening news, it's clear that few issues are as important to higher education — and the world at large — as the struggle to achieve diversity, equity and inclusion for all members of our society.

With that in mind — and in recognition of the challenges and opportunities created by the need to address one of its most important priorities — Liaison recently established the EngineeringCAS Diversity, Equity and Inclusion (DEI) Advisory Board. The Board's mission is to achieve greater representation of all underrepresented students in the graduate engineering population and to offer suggestions for implementing and evaluating effective strategies for doing so.

This is a great opportunity to make your voice heard regarding some of the most important issues in graduate engineering education today. If you're interested in learning more about the Board's work and the possibility of becoming a member, please connect with me today at drift.me/ronhyman. ∎

Participating members represent these forward-thinking engineering associations and institutions:

SHPE — Leading Hispanics in STEM
NSBE — NATIONAL SOCIETY OF BLACK ENGINEERS
GEM — THE NATIONAL GEM CONSORTIUM
UTD — THE UNIVERSITY OF TEXAS AT DALLAS
ASEE — AMERICAN SOCIETY FOR ENGINEERING EDUCATION
swe
AISES — AMERICAN INDIAN SCIENCE AND ENGINEERING SOCIETY
ROSE-HULMAN INSTITUTE OF TECHNOLOGY
OUT innovate — Science Technology Engineering Mathematics with PRIDE

ENGINEERING**CAS**™
by **LIAISON**

2018/2019 Cycle Report

This report aggregates data for all received and completed applications submitted through the Centralized Application Service (CAS) during the 2018-2019 admission cycle (**September 5, 2018, through March 31, 2020**). Its findings primarily reflect data for applications to **Summer 2019, Fall 2019, Winter 2020 and Spring 2020**. Liaison offers it as a resource to participating schools to assist in trend and recruitment analysis, benchmarking and strategic decision-making.
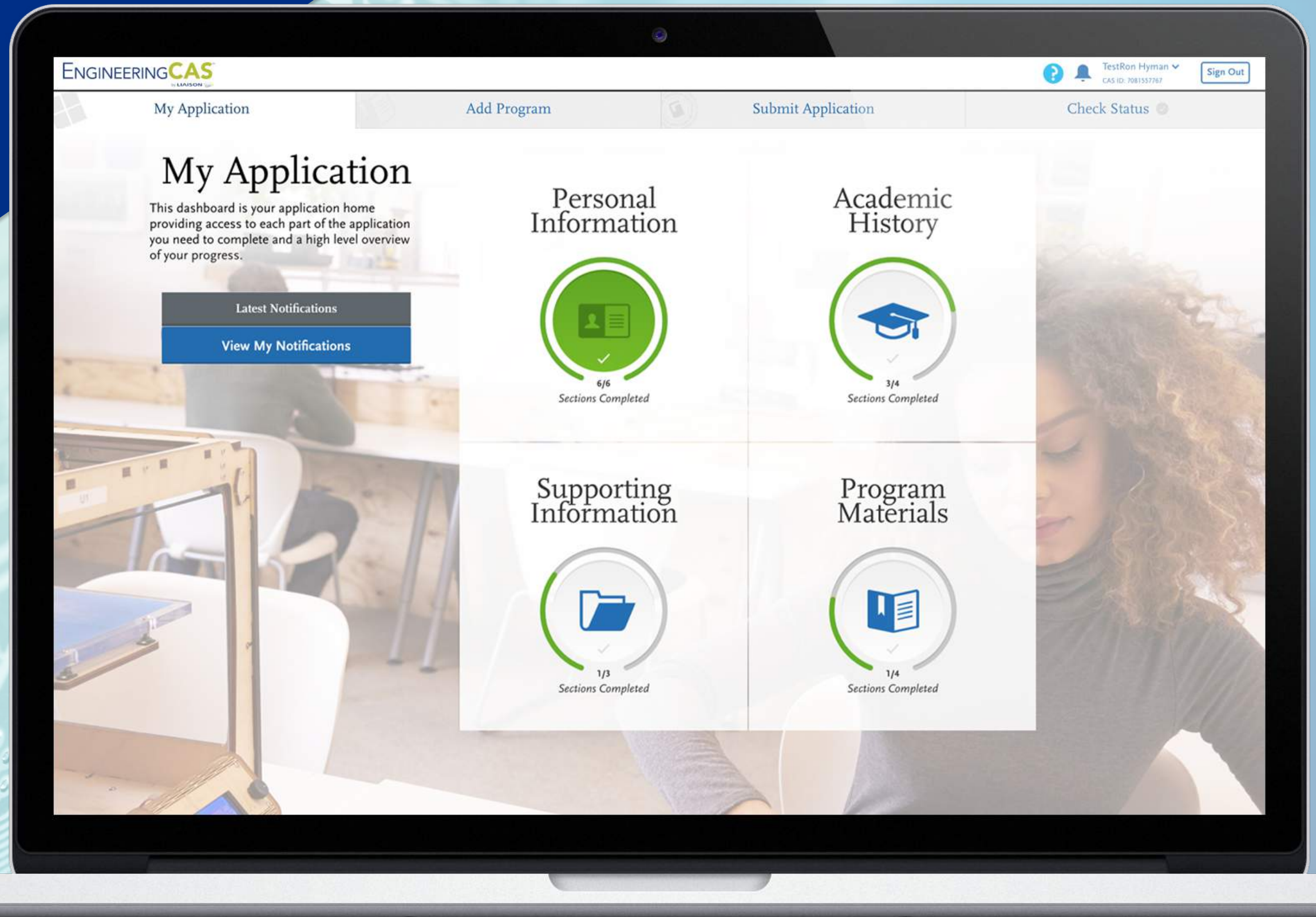
EngineeringCAS Summary

Launched in September 2017, EngineeringCAS grew quickly by 2018-2019, which was only its second year. Participating institutions have leveraged the CAS Community to expand their reach and the diversity of their applicant pools.

PARTICIPATING SCHOOLS BY STATE:

EngineeringCAS member schools represent public, private, research and historically black institutions from across the U.S. Currently, there are schools participating from the following states:

- ✓ Alabama
- ✓ California
- ✓ District of Columbia
- ✓ Florida
- ✓ Georgia
- ✓ Indiana
- ✓ Massachusetts
- ✓ New Mexico
- ✓ Oregon
- ✓ Rhode Island
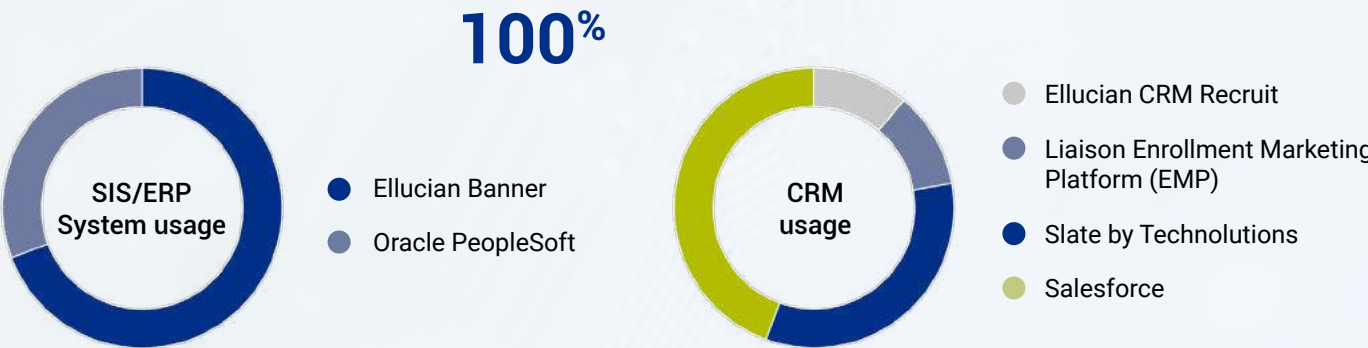- ✓ Tennessee
- ✓ Texas

PROGRAM FEE COLLECTION:

For 2018-2019, Liaison's processing fee for EngineeringCAS applications was $68 for the first designation and $40 for each subsequent designation. This has since been updated to **$58** for all designations. Many institutions seek application revenue by adding their own fees to Liaison's processing fee.

Programs Collecting Fees in addition to Liaison's Processing Fee

Not Collecting 31%
Collecting 69%

Total fees (*i.e., Liaison processing fee + school program fee*) range from **$70-$158**

For those collecting program fees, the average amount collected is **$40**
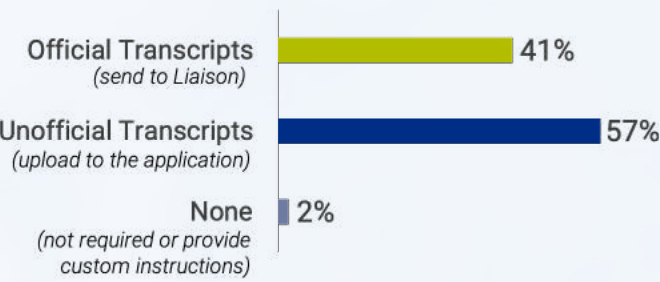
SOFTWARE SYSTEMS:

EngineeringCAS provides its members with tools, resources and consultation to enable data and document exports to local systems. This allows EngineeringCAS users to utilize such systems in complementary ways to manage their admissions processes.

Percentage of schools using the Export Manager tool to manage data and documents in the CAS: **100%**

SIS/ERP System usage
- Ellucian Banner
- Oracle PeopleSoft

CRM usage
- Ellucian CRM Recruit
- Liaison Enrollment Marketing Platform (EMP)
- Slate by Technolutions
- Salesforce

Program Summary

Programs that participate in EngineeringCAS reap the benefits of a Centralized Application Service and a community of their peers while maintaining the unique branding and requirements that help them admit and enroll best-fit students.

DESIGNATION DETAILS:

A "designation" refers to how a program is listed and can be selected within the CAS. Each designation allows EngineeringCAS users to specify the program name, fee, track, term, population and method of delivery. An applicant submits applications to programs as per these designation listings.

Program Level
- Doctorate: 26%
- Masters: 64%
- Certificates/Non-Degree: 10%

Delivery
- Onsite: 82%
- Online: 7%
- Hybrid: 11%

Enrollment
- Full-Time: 72%
- Flexible: 21%
- Unclassified: 7%

TRANSCRIPT REQUIREMENTS:

Liaison's processing team streamlines managing official transcripts by collecting them on behalf of EngineeringCAS users. However, schools may also choose to allow applicants to upload unofficial transcripts as part of the CAS.

- Official Transcripts *(send to Liaison)*: 41%
- Unofficial Transcripts *(upload to the application)*: 57%
- None *(not required or provide custom instructions)*: 2%

Total number of transcripts Liaison processed

	Processed for Submitted Applicants	Processed for In-Progress Applicants
Official US Transcripts	487	99
Unofficial US Transcripts	2,616	652
Foreign Evaluations	146	24

RECOMMENDATION REQUIREMENTS:

EngineeringCAS securely delivers recommendation letters via the Letters by Liaison platform, while also providing recommenders with an easy-to-use experience.

Recommendation Requirements

Not Required 19%
Required 81%
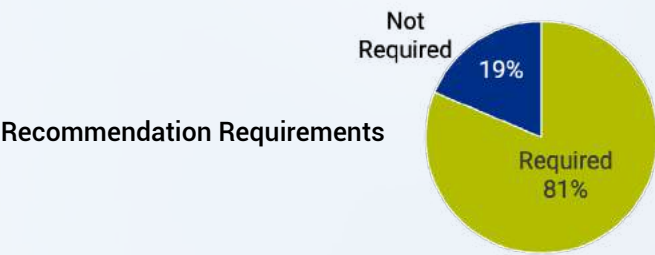
Average number of recommendations required:

Each designation determines minimum recommendations required and maximum recommendations allowed.

- ↓ Minimum – 2.56
- ↑ Maximum – 3.84

Total number of recommendation letters Liaison processed

	Processed for Submitted Applicants	Processed for In-Progress Applicants
Completed Recommendation Letters	25,387	1,647

Applicant Pool Summary

The diversity demonstrated by the applicant pool within EngineeringCAS appropriately reflects the wide range of programs at varied institutions within the CAS.

DEVICE USAGE:

Approximately **1 of every 5** applicants used a **mobile device** (as opposed to a desktop) to complete their EngineeringCAS application.
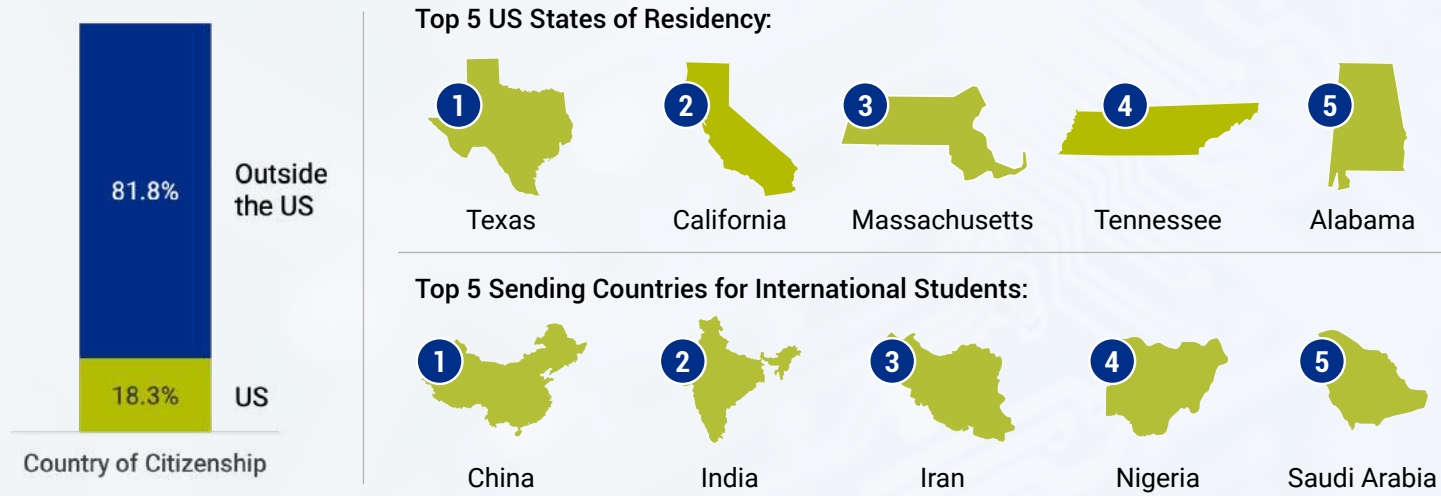
Nearly 70% of applicants used **Google Chrome** as their browser to apply to EngineeringCAS.

A growing population of applicants are using digital devices to complete the CAS application. We are currently in the process of upgrading the user experience to make the applicant experience using mobile devices seamless.
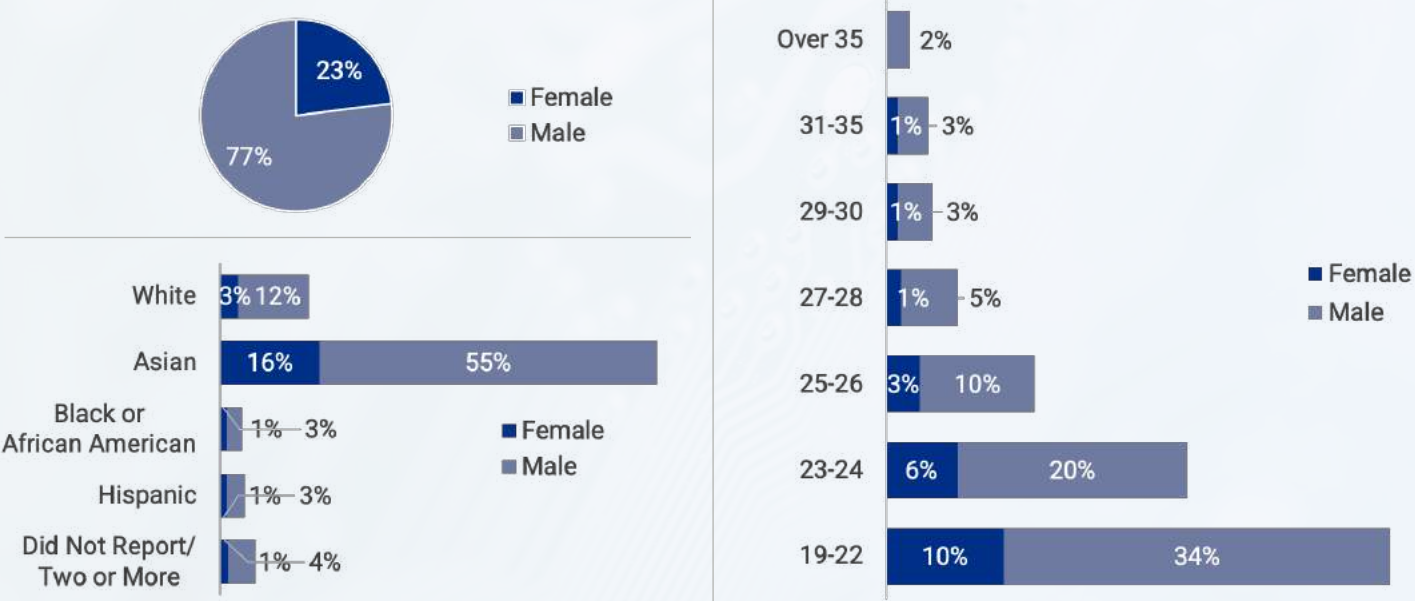
COUNTRY OF CITIZENSHIP.

The EngineeringCAS international applicant pool represented 90 countries with applications from India and China making up over 50% of the group. Within the US, EngineeringCAS drew applicants from 48 of the 50 states.

81.8% Outside the US

18.3% US

Country of Citizenship

Top 5 US States of Residency:

1. Texas
2. California
3. Massachusetts
4. Tennessee
5. Alabama

Top 5 Sending Countries for International Students:

1. China
2. India
3. Iran
4. Nigeria
5. Saudi Arabia

(Percentages <1% not shown)

GENDER, AGE, RACE & ETHNICITY:

The EngineeringCAS applicant pool distributed across gender, race and age reflected the overall graduate education trends seen in the field.

23% Female
77% Male

	Female	Male
White	3%	12%
Asian	16%	55%
Black or African American	1%	3%
Hispanic	1%	3%
Did Not Report/ Two or More	1%	4%

Age	Female	Male
Over 35		2%
31-35	1%	3%
29-30	1%	3%
27-28	1%	5%
25-26	3%	10%
23-24	6%	20%
19-22	10%	34%

TOP 10 UNDERGRADUATE MAJORS:

The EngineeringCAS applicant pool represents diverse academic backgrounds that span the breadth of fields within engineering.

1. Mechanical Engineering/Design
2. Computer Science and Engineering
3. Electrical and Electronic Engineering
4. Chemical Engineering
5. Other/None/Not Listed
6. Aerospace Engineering
7. Engineering
8. Petroleum Engineering
9. Materials Science
10. Biomedical Engineering

TEST SCORES:

We have the ability to collect official GRE and TOEFL scores on behalf of the school although students can self-report on a variety of scores.

Average self-reported GRE score (scaled):	Quantitative	Verbal
All programs	**163.17**	**152.44**
Ph.D. programs	162.81	152.33
Master's programs	163.26	152.49

ACADEMIC PERFORMANCE:

While EngineeringCAS collects self-reported credits and GPA for foreign institutions, the difference in scales across countries makes it difficult to report averages. As a result, all self-reported credits and GPA averages are based on studies at US institutions only.

Average cumulative GPA:	
Undergraduate	**3.37**
Graduate	**3.62**

Average number of credits earned:	
Undergraduate	**100.21**
Graduate	**34.02**

Conclusion

Until now, very little data has been captured about graduate-level engineering programs and the students who leverage these opportunities to either enhance their current careers or begin new career paths. With the support of the EngineeringCAS Community, we are now in the position to create a one-of-a-kind report that lays a foundation for longitudinal analysis of how students make academic choices in pursuit of graduate degrees in the field.

In a world constantly in flux due to COVID-19 and its repercussions, the most important realization engineering schools can make today is that they should not and will not return to a pre-pandemic state of affairs. EngineeringCAS will provide such data annually to help participating schools navigate the new normal, informing their ability to structure, enhance and improve their academic offerings while helping students understand the breadth of opportunities available in graduate engineering education. While the report focuses on data trends within EngineeringCAS as a whole, participating schools can choose to utilize Analytics by Liaison to review how their institution performs in comparison. ◼

SEE IT IN ACTION
Watch an EngineeringCAS demo at
lsnedu.com/in-action

They're Making the Job Easier

at South Dakota State University's College of Engineering

SOUTH **D**AKOTA **S**TATE **U**NIVERSITY

Bruce Berdanier, Ph.D., Dean of the Jerome J. Lohr College of Engineering at South Dakota State University, initially heard about EngineeringCAS when he read about it in this magazine near the end of 2020. By January 2021, the implementation of EngineeringCAS was already underway at his school's Brookings campus.

Coordinator for Recruitment and Outreach Pete Roberts explains why the College moved so quickly: "Our main challenges at the time included declining international graduate student enrollment and the need to be able to more widely market out programs while maintaining our distinction."

Although Roberts was also unfamiliar with EngineeringCAS at first, he saw similarities between EngineeringCAS and the Common App for undergraduates and immediately understood the appeal. Upon further investigation, the appeal continued to grow.

Wider Appeal and Pull

"Schools use the Common App for undergraduate programs because they want to be seen in the same bucket as their peers and other schools," Roberts said. "EngineeringCAS does that for graduate-level engineering programs. That was big for us. Dean Berdanier also really liked the fact that the American Society for Engineering Education (ASEE) is an EngineeringCAS partner. And then we actually found out that the University's College of Nursing has been using NursingCAS [Liaison's Centralized Application Service for nursing programs] for about six or seven years and has been seeing success with it.

"EngineeringCAS is going to present a great opportunity for not only centralizing applications and improving that process but also getting in front of other students we might not otherwise be able to reach. When they're looking for other schools they've already heard of, they'll be able to see us as well and realize we're a good option."

According to Roberts, it was necessary to work with several other department leaders on campus in order to begin implementing EngineeringCAS — including those in the graduate school, admissions, IT and provosts' offices. Liaison made it easy.

Shared Goals

"The Liaison team did a great job of making sure that we addressed all our stakeholders' concerns and met with all of the groups for buy-in," Roberts said. "The Liaison staff that we've been working with since we started implementing EngineeringCAS have also done a really great job of outlining what we need to do every week. That's really helpful."

Roberts anticipates additional benefits to come.

"I've been a fly on the wall in a lot of meetings, and I think "EngineeringCAS is going to allow us to make our evaluation of candidates more consistent and efficient. I think our faculty are going to enjoy it more, too," he said. "Because if you've got the right tools for the job, it definitely makes the process easier and more enjoyable, right?" ▪

ENGINEERING**CAS**™
by **LIAISON**

engineeringcas.org | #buildabetterclass