

KELLY[®]

engineering
resources

SPOTLIGHT ON ENGINEERING:

PROMISING FUTURES FOR NEW ENGINEERS

JOSEPH LAMPINEN & TIM McAWARD



We need engineers. In the race to become more efficient, to increase innovation, and to create new and better products, engineers are vital.

We need engineers to create solutions to complex, global challenges, to show organizations the way forward, to make ideas reality—and we need them in greater numbers than ever before.

In fact, the world doesn't just need more engineering graduates, it needs more engineering spirit and effort. It needs creative, bold, and valued engineering minds that have both technical skill and the opportunities to apply new thinking.

Unfortunately, much of the existing engineering talent, particularly in the “big four” disciplines (civil, mechanical, industrial, and electrical), is now retiring. And as a result, employers are finding it harder to find qualified replacements with the right combination of skills *and* experience.

This is tough for organizations, but it also creates a big opportunity for young engineers keen to learn and innovate.

KEY HIGHLIGHTS

In this ebook, you will learn about:

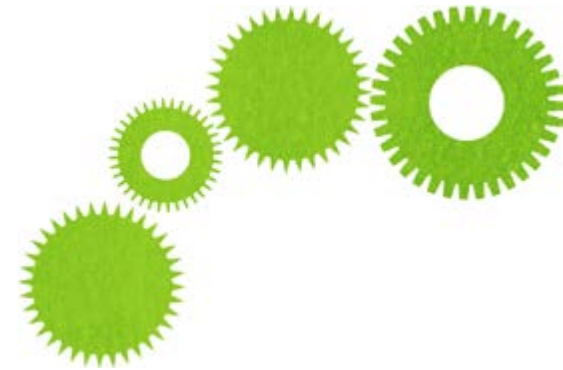
- Trends shaping the industry
- Top engineering occupations
- Earning potential
- Hot spots for engineering jobs



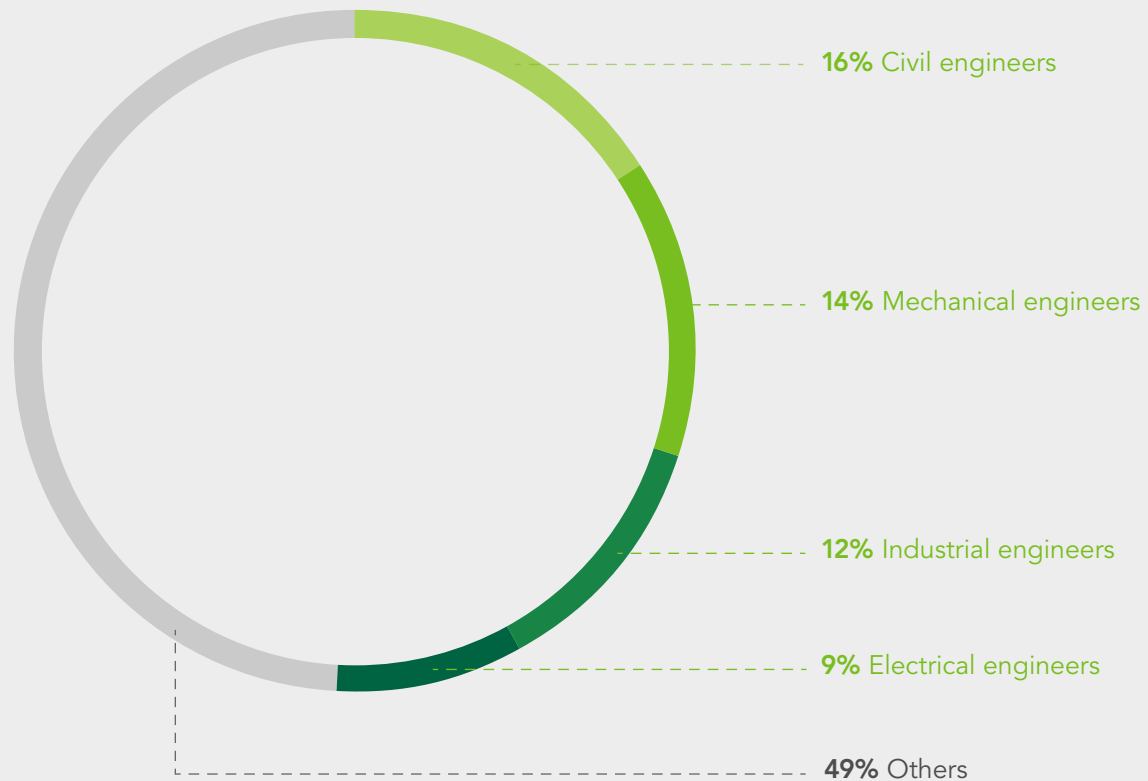
As the world's organizations seek advances in industrial automation, sustainability, biotechnology, automotive technology, and oil and gas exploration and production, there are more opportunities for engineers with the right technical skills.

So, where will the next generation of engineering innovators and creative thinkers come from? Could you be among them?

And if so, how will you differentiate yourself from other job candidates?



SNAPSHOT OF ENGINEERING TODAY



We know that there were more than 1.9 million engineers in the U.S. in 2013 (around 1% of the total workforce).

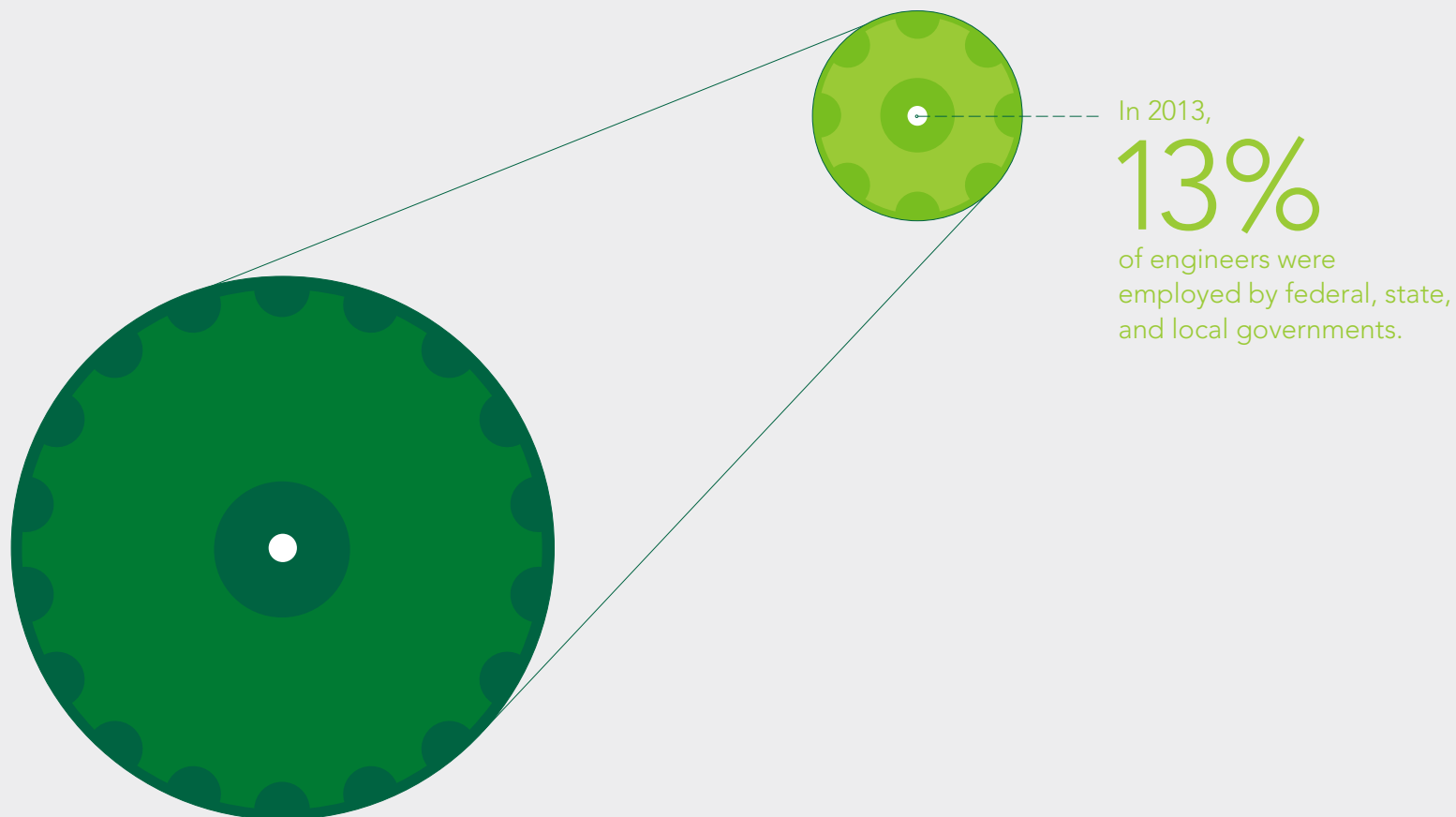
Of these,

51%

are working in one of the "big four" engineering fields (civil, electrical, industrial, and mechanical).



GOVERNMENT IS A MAJOR EMPLOYER OF ENGINEERING TALENT



WHAT ENGINEERS EARN

Among the major college disciplines, engineering offers the highest earning potential, from graduation day onward. In fact, seven of the top 10 highest average starting salaries are earned by graduates with engineering degrees.

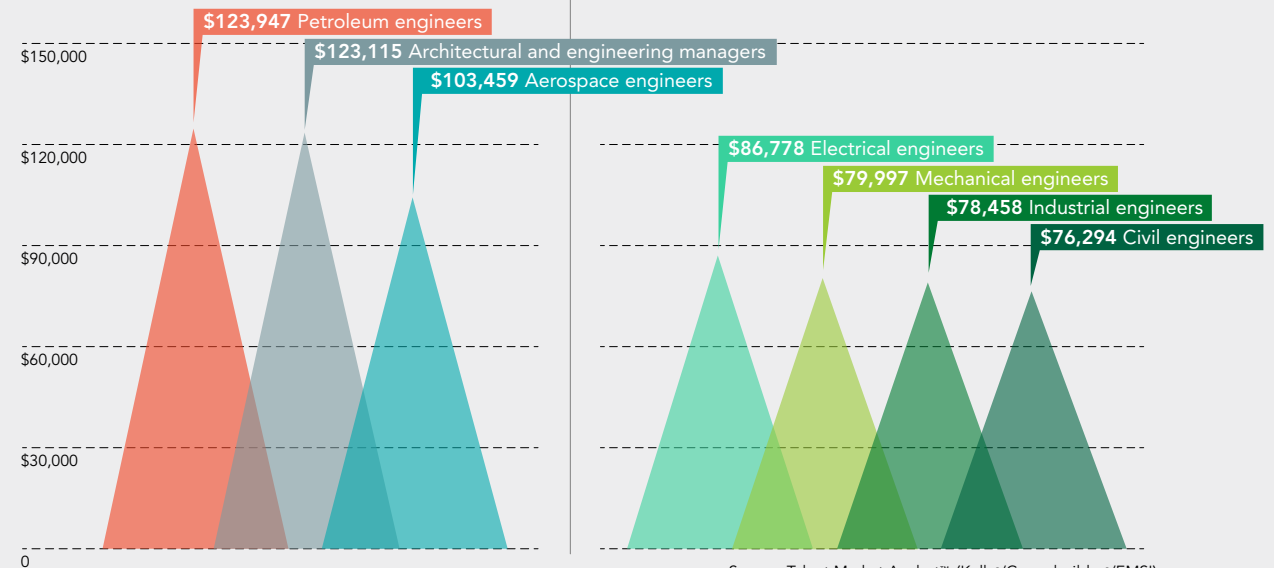
Starting salaries: It is clear that an engineering major provides a competitive wage that rewards you for your hard work. While other professions have suffered due to the economic downturn, engineering

professions continue to grow and prosper.

- According to NACE's September 2013 *Salary Survey*, seven out of the 10 highest-paying bachelor's degrees were engineering majors.
- The median starting salary for all applicants with a bachelor in the engineering field is \$53,400¹.
- Some engineering fields record close to zero unemployment, including geological and geophysical engineering².

MEDIAN ANNUAL SALARIES

TOP THREE ENGINEERING OCCUPATIONS



¹ <http://www.mtu.edu/engineering/outreach/welcome/salary/>

² <http://cew.georgetown.edu>

WHERE THE JOBS ARE

Around
35%
of job growth over
the next decade will
be in these cities.



Of them all, **Houston, TX** is expecting the strongest growth among the “big four” disciplines, projecting an increase of **17%** from now until 2023.

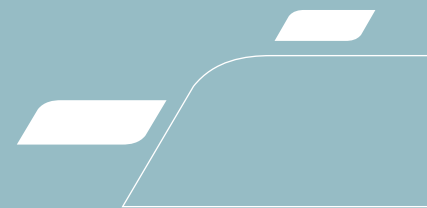
Source: Talent Market Analyst,
(Kelly/Careerbuilder/EMSI)



The top 10 leading metropolitan areas for engineering talent projected over the next decade



GROWTH AND DEMAND



Over the next decade, demand for engineers is forecast to grow by 11%. In fact, when the National Association of Colleges and Employers conducted their survey of hiring intentions in 2013, engineering majors ranked number two in the list of most-in-demand skill sets.

Although the manufacturing industry has only modest growth projections for engineering jobs in the sector, specialty disciplines are expected to see robust growth that will outstrip available domestic supply.

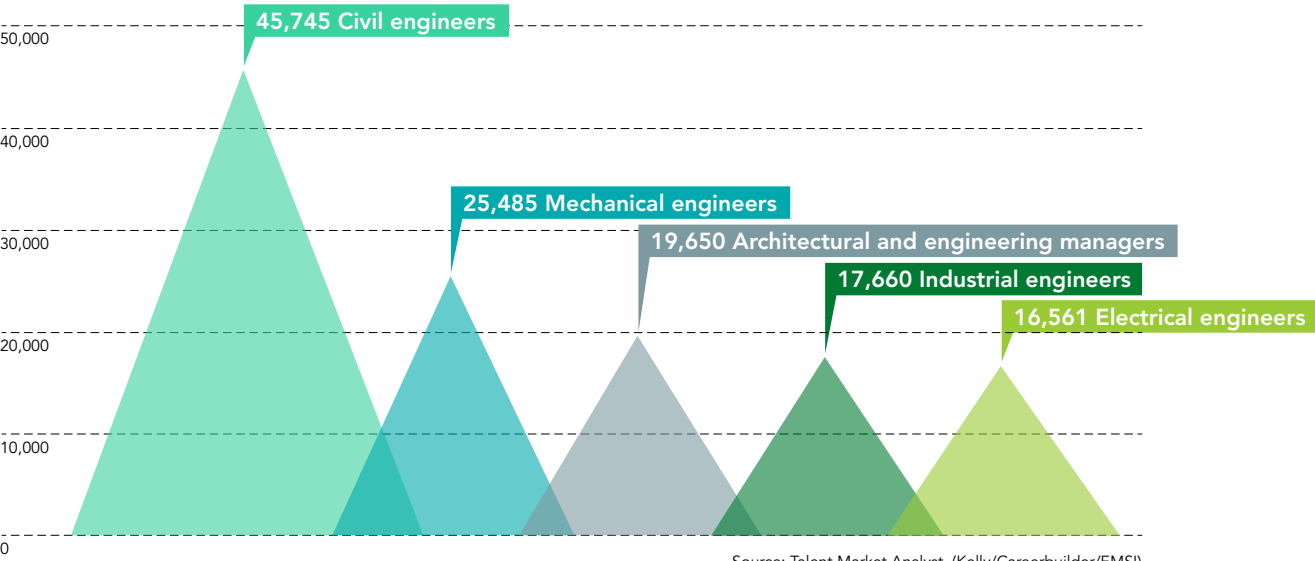
- Environmental, petroleum, and nuclear engineers will see increased demand for their skills as the importance of innovation in the energy sector increases.
- Between 2013 – 2023, biomedical engineers are forecast to experience the fastest growth rate among all engineering disciplines—a massive 56%. This is driven mainly by the rapidly aging population and the associated upswing in the healthcare industry.

**IN THE NEXT 10
YEARS, THERE WILL
BE MORE NEW JOBS
FOR CIVIL ENGINEERS
THAN FOR ANY
OTHER ENGINEERING
DISCIPLINE.**



- The “big four” disciplines will still add the bulk of new workers over the next decade. Civil engineers are expected to post the largest growth over the next 10 years, with demand increasing due to the ongoing need to improve the nation’s infrastructure.
- The “big four” engineering disciplines are forecast to generate the largest net growth in new jobs by 2023 (in addition to replacement of retirees and others who will leave the field).

JOB GROWTH FORECAST (2013 – 2023)



Source: Talent Market Analyst, (Kelly/Careerbuilder/EMSI)



TOP DEGREES IN DEMAND, BY DEGREE LEVEL AND BROAD CATEGORY

	BROAD CATEGORY	% OF TOTAL RESPONDENTS WHO WILL HIRE DEGREED ENGINEERING STUDENTS (N=196)
BACHELOR'S	Business	86.2%
	Engineering	77.6%
	Computer & Information Sciences	63.2%
	Sciences	47.1%
	Communications	33.3%
	Liberal Arts	21.3%
	Agriculture & Natural Resources	9.2%
MASTER'S	Business	73.4%
	Engineering	64.0%
	Computer & Information Sciences	48.2%
DOCTORATE	Engineering	75.4%
	Computer & Information Sciences	44.6%
	Sciences	41.5%
	Business	32.3%
	Humanities & Social Sciences	13.8%
	Education	4.6%



BIG TRENDS IN ENGINEERING



While engineers with traditional skills are always in demand, new technologies, demographic changes, and other factors are driving demand for specialized skill sets, including:

- Embedded software
- Advanced manufacturing and manufacturing services
- Sustainability
- Biotechnology and healthcare technologies
- Energy technology
- 3D and imaging technology
- Infrastructure improvements

In addition to this, the way that companies are engaging engineers to complete work is changing. There are more flexible projects available, and accessing these at the right time during the different stages of your career can help you gain specific skills and experience—as well as demonstrate skills employers would otherwise not be aware you have.

**ORGANIZATIONS
ARE NOW SEEKING
ENGINEERING TALENT
TO SOLVE SOME OF
THEIR CORE CHALLENGES
IN NONTRADITIONAL
WAYS, INCLUDING
CROWDSOURCING.**

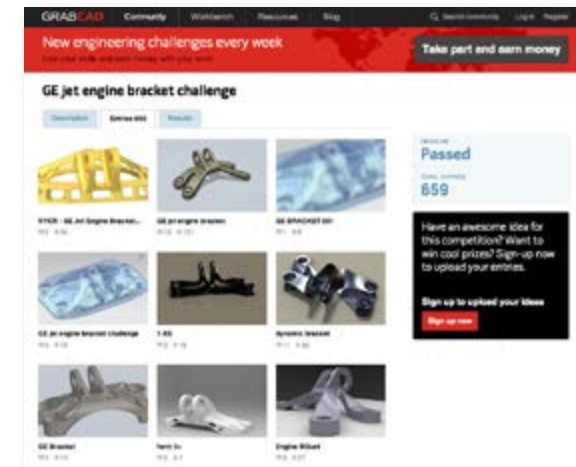


As the recent GE® “jet engine bracket challenge” showed, organizations are now seeking engineering talent to solve some of their core challenges in nontraditional ways, including crowdsourcing.

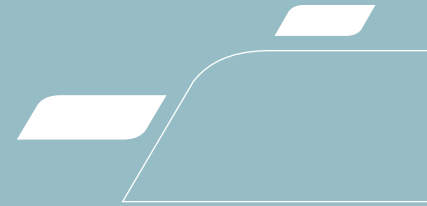
What GE does

- Their global website (called GrabCAD®) features small but significant engineering challenges that they need help solving.
- The site provides “two-phase competitions” for engineers (aspiring or qualified)—they must improve the design of a specific item (such as a jet engine bracket) and submit it for judging. Then, the top designs are tested and possibly put into production.
- They ask their leading engineering talent to judge the designs and to be part of the project.
- All the entries are displayed on their website for others to see and create a innovation community.

Although this is one small project, it is an example of how companies with innovation at their core are inspiring current and future engineers to help them solve their problems. These kinds of initiatives also provide opportunities for new engineering talent to access work and hone their skills.



WHAT TOMORROW'S ENGINEER MIGHT LOOK LIKE



Predominately, the field of engineering continues to be dominated by an older and primarily male workforce.

This homogeneity in this skill set creates specific challenges for hiring companies, and many are actively seeking engineers from more diverse backgrounds to mitigate these risks. This creates a big opportunity for engineering students from diverse backgrounds.

Retirement: More than 50% of the U.S. engineering workforce is 45 or older, compared with just over 40% of the overall labor force. Many organizations are actively seeking younger engineers to balance their workforce and provide better succession planning.

Lack of women: Women earn around 20% of all engineering degrees, and have shown significant growth in attaining higher-level degrees in recent years. However, they comprise just 13% of the engineering workforce. Women are exceptionally underrepresented in the mechanical engineering field (7%), but make up around one in 10 workers in fields such as electrical and computer hardware engineering, according to the National Science Board⁴.



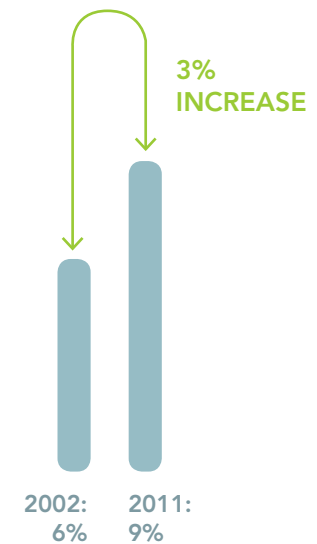
⁴ <http://www.nsf.gov/statistics/seind14/index.cfm/chapter-3/c3s5.htm>



Small changes in long-term diversity trends: Diversity trends among engineering graduates and employees have remained relatively unchanged over the past decade or more. Although the field shows a decline in the representation of African-Americans and Asians, there has been a small increase in the percentage of Hispanic engineers. Many organizations would like to see their engineering workforces reflect the broader population, and indeed, their customer base:

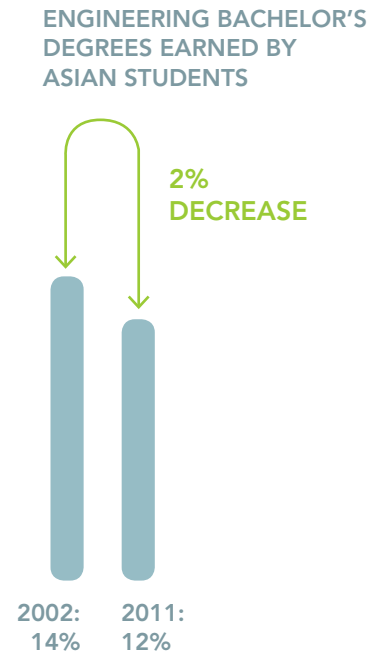
- Hispanic students accounted for 6% of engineering bachelor's degrees in 2002 and 9% in 2011; among engineering master's degrees, Hispanic recipients rose from 4% in 2002 to 6% in 2011.
- The percentage of engineering bachelor's and master's degrees earned by African-Americans has decreased over the past 10 years, and remain well below their overall degree rates.

ENGINEERING BACHELOR'S DEGREES EARNED BY HISPANIC STUDENTS

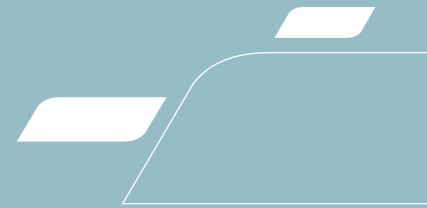


- The percentage of Asian students receiving engineering bachelor's degrees has fallen from 14% in 2002 to 12% in 2011, but this is still significantly higher than the overall concentration of Asian students receiving bachelor's degrees (7%).

Lack of diversity and gender balance continues to be a core strategic issue for the engineering discipline, but demographics are starting to shift. More companies are actively hiring women and people from diverse backgrounds, providing numerous opportunities for people who had previously been underrepresented in the industry.



GLOBAL DEGREES, GLOBAL JOBS



For organizations seeking engineering skill sets, it is now more than ever a global market. And, if U.S. companies are going to compete globally, they will be increasingly compelled to successfully engage with engineers that are living and working elsewhere.

Consider these facts:

- More than half of all engineering doctorates (54%) in the U.S., and nearly half of all engineering master's degrees (44%), are earned by nonresident students.
- International students account for 70% of full-time graduate students in electrical engineering in the U.S.
- More than half of full-time graduate students are foreign nationals in industrial engineering, chemical engineering, materials engineering, and mechanical engineering.
- Roughly one-third of people who hold engineering degrees in the U.S. today were born outside the U.S.



**INTERNATIONAL
STUDENTS ACCOUNT
FOR 70% OF FULL-TIME
GRADUATE STUDENTS IN
ELECTRICAL ENGINEERING
IN THE U.S.**



The global shortage of engineering talent is becoming more acute. This is driven by many factors, not least of which is China's impending talent shortfall (somewhere in the order of 25 million people by 2020 according to the McKinsey Global Institute).

What does this mean for those starting their careers? Well, it's likely that engineering skills will continue to be in high demand for some time yet. In addition, it is increasingly likely that your current or future employer will be looking further afield for engineering skills—they will be conducting global talent searches.

This means it matters less where engineering graduates choose to live and work after attaining their degree—access to a global market for engineering work is now becoming a reality. What's more, overseas experience will become an even greater differentiator of candidates, as will complementary skills such as a second language and a working knowledge of other cultures and work-styles.

**IT IS INCREASINGLY
LIKELY THAT YOUR
CURRENT OR
FUTURE EMPLOYER
WILL BE LOOKING
FURTHER AFIELD
FOR ENGINEERING
SKILLS—THEY WILL BE
CONDUCTING GLOBAL
TALENT SEARCHES.**



HIGH DEMAND FOR SOFT SKILLS



Gaining an engineering degree in any field already provides graduates with an in-demand skill set. However, employers today are looking for engineers that can demonstrate expertise in specific soft skills too.

Most hiring managers know that in the real world, engineers must not only be technically proficient, but they must understand how organizations really tick. They must express themselves clearly and professionally, display strong teamwork and project management abilities, and work collaboratively to solve complex problems that may not always have technical causes. So, when applying for roles as an engineer, remember to focus not only on technical skills but soft skills as well—this is often the differentiating factor between job candidates.

**WHEN APPLYING
FOR ROLES AS AN
ENGINEER, REMEMBER
TO FOCUS NOT ONLY ON
TECHNICAL SKILLS BUT
SOFT SKILLS AS WELL.**



7 SKILLS RATED “VERY” OR “EXTREMELY” IMPORTANT BY EMPLOYERS

IMPORTANCE OF CANDIDATES’ SKILLS (2013)	
Strong verbal communication skills	4.5
Ability to make decisions and solve problems	4.5
Ability to obtain and process information	4.5
Ability to plan, organize, and prioritize work	4.5
Ability to analyze quantitative data	4.2
Technical knowledge related to the job	4.1
Proficiency with computer software programs	4.1

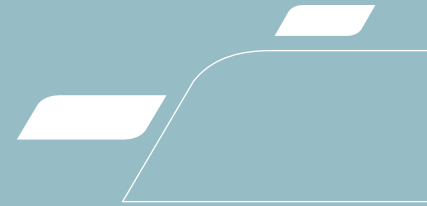
Skills and attributes rated on a 5-point scale:

- 1 = Not important
- 2 = Not very important
- 3 = Somewhat important
- 4 = Very important
- 5 = Extremely important

Source: http://www.roanestate.edu/webfolders/HARRISKB/placement/articles/staff/Job_Outlook_2013-Spring_Update.pdf



YOUR COMPETITIVE EDGE



In a recent survey conducted by the American Society of Mechanical Engineers®, members were asked to rate the most needed skills to ensure success in a career in engineering. Again, overwhelmingly, the response was communication skills.

These soft skills are now seen by employers as just as important as technical skills. Developing these skills will ensure that you are a competitive candidate and an asset to any workplace.

Communication: Being able to communicate with co-workers, clients, and other stakeholders is important in any profession. However, as engineers concentrate on their technical skills, many have neglected their communication skills. By ensuring that you are able to effectively communicate, you are ensuring that you stand out from the crowd.

Flexibility: Engineering is a profession undergoing a great deal of change and expansion. This creates exciting opportunities for emerging engineers, but also great challenges. Being able to adapt to a field that is rapidly evolving is essential to a successful career in engineering.

**SOFT SKILLS ARE NOW
SEEN BY EMPLOYERS AS
JUST AS IMPORTANT
AS TECHNICAL SKILLS.**



Creativity: Creative thinkers drive innovation. As engineers begin to work on new and exciting projects, it is important to be able to see things from different perspectives and to be able to think outside the box. Creativity assists in problem-solving, assessing work processes, and helps to advance development. Being creative can increase productivity and will make you indispensable to your employer.

Collaboration: Engineering is a profession that requires a great level of teamwork; being able to collaborate effectively is critical. Collaboration requires communication, coordination, and management skills. By proving you can effectively collaborate, you are showing prospective employers that you are a necessary addition to their team.

Technical skills are the foundation of a career in engineering. However, it is important to develop your soft skills as well as your technical proficiency. Employers are increasingly using these interpersonal skills to separate out potential employees from a multitude of candidates. By working on these skills, you are ensuring you are an employable candidate, an essential employee in your workplace and, ultimately, a vital member of the engineering profession.

DID YOU KNOW?

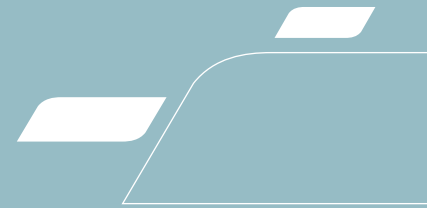
WHAT IS THE
MOST COMMON
UNDERGRADUATE
DEGREE EARNED BY
TOP CEOS?

THAT'S RIGHT, AN
ENGINEERING
DEGREE. MORE TOP
CEOS EARNED THEIR
BACHELOR'S DEGREE IN
ENGINEERING THAN ANY
OTHER MAJOR⁵.

⁵ <http://www.arecentstudy.com/studies/S&P%20500%20CEOs.pdf>



**WANT TO
BRING NEW
IDEAS TO LIFE?**



Engineering is a creative pursuit. Yes, it requires technical skill, but that skill must be married with creativity, excellent teamwork, and collaboration skills, as well as a thirst for innovation. When one person has all of those capabilities, he or she is no longer just another engineer, but sought-after engineering talent.

Organizations everywhere know that the demand for engineering talent is now global and growing. As a result, they are also more aware of the risks associated with a still largely homogeneous and aging engineering workforce, and they are seeking new ways to engage diverse, budding engineering talent to address those risks.

Now more than ever, we know that engineers are not only the hub of innovation and change inside organizations, they are a global resource with globally applicable skills. And all the indications are that the opportunities for engineers around the world will continue to expand.

So, if you have ever thought about changing the world, engineering could be the career for you.

**ALL THE INDICATIONS
ARE THAT THE
OPPORTUNITIES FOR
ENGINEERS AROUND
THE WORLD WILL
CONTINUE TO EXPAND.**



REFERENCES:

<http://www.nae.edu/Projects/Events/AnnualMeetings/2013AnnualMeeting/89114.aspx>

<http://www.forbes.com/sites/stuartanderson/2013/07/15/international-students-are-70-of-ee-grad-students-in-u-s/>

<http://grabcad.com/challenges/ge-jet-engine-bracket-challenge>

<http://files.asme.org/asmeorg/Campaigns/MS/2012/32754.pdf>



Kelly® puts a new employee to work every 33 seconds, and every four minutes one is hired full time by a Kelly customer.

Search for jobs on our **Kelly Career Network®**, join our **Talent Network**, or visit **kellyservices.us** to get started today.

ABOUT THE AUTHORS

JOSEPH LAMPINEN is director of the Americas engineering product group of Kelly. In his current role, he is responsible for the strategic development and growth of engineering staffing, search and project services in the Midwest and Canada, with special interest in manufacturing, engineering, plant/facilities engineering, sustainability, and Lean Six Sigma®. Mr. Lampinen joined Kelly in 1998 as a technical branch manager in the Chicago market and subsequently served as Midwest regional engineering manager. Prior to joining Kelly, he was an operations director with Laidlaw Corporation in the Midwest. He holds an interdisciplinary Bachelor of Arts degree from Western Illinois University, a graduate certificate in engineering law and management from the University of Illinois at Chicago, and is currently a graduate student in technology at Purdue University. Mr. Lampinen is a certified manufacturing engineer, project management professional (PMP®), and LEED® AP. In addition, he is an active member of several engineering and professional organizations, including the Society of Manufacturing Engineers, Project Management Institute®, Association for Facilities Engineering®, and American Society for Quality®.



TIM McAWARD is vice president and Americas product group leader for the engineering staffing brand of Kelly. As product leader, he has responsibility for branding, market positioning, “go to market” strategies, and profitability for the product across North America. Mr. McAward holds a Bachelor of Science, Finance degree from Arizona State University and a Master of Business Administration degree from St. Edward’s University in Austin, Texas.



ABOUT KELLY

Kelly Services, Inc. (NASDAQ: KELYA, KELYB) is a leader in providing workforce solutions. Kelly offers a comprehensive array of outsourcing and consulting services as well as world-class staffing on a temporary, temporary-to-hire, and direct-hire basis. Serving clients around the globe, Kelly provided employment to approximately 540,000 employees in 2013. Revenue in 2013 was \$5.4 billion. Visit kellyservices.us today.

Since employing its first engineer in 1965, the Kelly engineering specialty has grown to be recognized as a leading provider of engineering resources to customers in such industries as automotive, chemical, defense, electronics, energy, medical device, and pharmaceutical.

Want more information? Visit kellyservices.us/engineering today.

Kelly Engineering Resources® is a registered trademark of Kelly Services
This information may not be published, broadcast, sold, or otherwise distributed without prior written permission from the authorized party.
All trademarks are property of their respective owners. An Equal Opportunity Employer © 2014 Kelly Services, Inc. Z1193A