Official NSF-REE Survey

Q1 Thank you for taking our survey! We realize that your time is extremely valuable, and we sincerely appreciate your input!

The primary purpose of this research is to understand different attributes, motivations, and expectations of engineers and to compare these items based upon membership in different engineering organizations. Your feedback on this study will help to understand some of the pre-education traits, educational experiences, and post-education outcomes of engineers. These results will help to inform recommendations to university and workplace settings to better educate more prepared engineers of the future to help address pressing global challenges.

There are no foreseeable risks to your participation in this survey. The potential benefits include contributions towards recommended changes for the future of engineering education and workplace initiatives.

We anticipate this survey to take you approximately 15-20 minutes. Your participation is voluntary and your responses are confidential; they will not be reported in any manner that will identify you. At the end of the survey, you will have the opportunity to be entered into a raffle for an iPad or a $10 Amazon gift card, providing your thorough completion of the survey. We anticipate the approximate odds of winning an iPad to be 2 in 5,000, and the approximate odds of winning a gift card to be 10 in 5,000.

If you have any questions regarding your participation in this research, you should ask the investigator before participating. If you should have questions or concerns during or after your participation, please contact Kaitlin Litchfield at kaitlin.litchfield@colorado.edu or Dr. Amy Javernick-Will at amy.javernick@colorado.edu.

If you have questions regarding your rights as a participant, any concerns regarding this project or any dissatisfaction with any aspect of this study, you may report them -- confidentially, if you wish -- to the Executive Secretary, Institutional Review Board, 3100 Marine Street, Rm A15, 563 UCB, (303) 735-3702.

This research is sponsored by the National Science Foundation - Research in Engineering Education Program.

❑ Check to indicate you have read the statement above and agree to participate in the survey

Q2 Which of these engineering subjects is most related to your educational experience?

- ❍ Aerospace Engineering
- ❍ Architectural Engineering
- ❍ Biological/Biomedical Engineering
- ❍ Chemical Engineering
- ❍ Civil Engineering
- ❍ Computer Science/Engineering
- ❍ Electrical Engineering
- ❍ Environmental Engineering
- ❍ Industrial Engineering
- ❍ Materials and Metallurgical Engineering
- ❍ Mechanical Engineering
- ❍ Other Engineering
- ❍ Non-engineering

Q3 Of the organizations listed below, with which are you involved? (Select all that apply)

	Official member	Involved but not an official member
American Society of Civil Engineers	❍	❍
American Society of Mechanical Engineers	❍	❍
Other professional engineering organization	❍	❍
Society of Women Engineers	❍	❍
Engineers Without Borders-USA	❍	❍

Q4 Are you a student or professional member of your selected organizations?

- ❍ Student member
- ❍ Professional member

Answer If Of the organizations listed below, with which are you involved? (Select all that apply)...

Q5 For each of your selected organizations, please indicate the approximate number of years you have been involved.

	1 year or less	2-3 years	4-5 years	6-7 years	8-9 years	10 years or more
American Society of Civil Engineers	❍	❍	❍	❍	❍	❍
American Society of Mechanical Engineers	❍	❍	❍	❍	❍	❍
Other professional engineering organization	❍	❍	❍	❍	❍	❍
Society of Women Engineers	❍	❍	❍	❍	❍	❍
Engineers Without Borders-USA	❍	❍	❍	❍	❍	❍

Answer If Of the organizations listed below, with which are you involved? (Select all that apply)...

Q6 For each of your selected organizations, please indicate your current level of active participation.

	No active participation	Limited active participation	Moderate active participation	Extensive active participation
American Society of Civil Engineers	❍	❍	❍	❍
American Society of Mechanical Engineers	❍	❍	❍	❍
Other professional engineering organization	❍	❍	❍	❍
Society of Women Engineers	❍	❍	❍	❍
Engineers Without Borders-USA	❍	❍	❍	❍

Answer If Of the organizations listed below, with which are you involved? (Select all that apply) Engineers Without Borders-USA - Official member Is Selected Or Of the organizations listed below, with which are you involved? (Select all that apply) Engineers Without Borders-USA - Involved but not an official member Is Selected

Q7 Have you traveled outside of the US for a project with EWB-USA?

- ❍ Yes
- ❍ No

Q8 What is your current level of active participation in an engineering service curriculum, organization, or program similar to, but NOT including, Engineers Without Borders-USA (for example, Engineers for a Sustainable World organization, Engineering Projects in Community Service program, a Humanitarian Engineering minor or certificate program, etc.)?

- ❍ Not associated with such a program
- ❍ Associated, but no active participation
- ❍ Limited active participation
- ❍ Moderate active participation
- ❍ Extensive active participation

Answer If What is your current level of active participation in a p... Associated, but no active participation Is Selected Or What is your current level of active participation in a p... Limited active participation Is Selected Or What is your current level of active participation in a p... Moderate active participation Is Selected Or What is your current level of active participation in a p... Extensive active participation Is Selected

Q9 Based on your response to the previous question, with which specific program(s) or organization(s) are you involved?_____

Answer If Are you a student or professional member of your selected organizations? Student member Is Selected

Q10 How likely is it that you will be doing each of the following in the next five years?

	Definitely not	Probably not	Not sure	Probably yes	Definitely yes
Working in design or development in industry within your engineering discipline	❍	❍	❍	❍	❍
Working at a not-for-profit organization doing community development work	❍	❍	❍	❍	❍
Working as a teacher in an engineering-related subject (e.g. math, science)	❍	❍	❍	❍	❍
Working as a researcher within your engineering discipline	❍	❍	❍	❍	❍
Working in an engineering firm in a project management role	❍	❍	❍	❍	❍
Working in upper level management at an engineering company	❍	❍	❍	❍	❍
Working in the military as an engineer	❍	❍	❍	❍	❍
Working in a role concerning public policy, government, or law	❍	❍	❍	❍	❍
Working doing something other than engineering design, research, or management	❍	❍	❍	❍	❍
Not working full time by choice	❍	❍	❍	❍	❍
Attending graduate school within engineering	❍	❍	❍	❍	❍
Using the engineering degree as a stepping stone to a different professional degree (e.g. medicine, law, business)	❍	❍	❍	❍	❍

Answer If Are you a student or professional member of your selected organizations? Professional member Is Selected

Q11 Of the options listed below, which roles have you been in since graduating with your engineering degree? You may select as many options as applicable.

- ❑ In design or development in industry within your engineering discipline
- ❑ At a not-for-profit organization doing community development work
- ❑ As a teacher in an engineering-related subject (e.g. math, science)
- ❑ As a researcher within your engineering discipline
- ❑ At an engineering firm in a project management role
- ❑ In upper level management at an engineering company
- ❑ In the military as an engineer
- ❑ In a role concerning public policy, government, or law
- ❑ In a role other than engineering design, research, or management
- ❑ Not working full time by choice
- ❑ As a graduate student within engineering
- ❑ As a student using your engineering degree as a stepping stone to a different professional degree (e.g. medicine, law, business)

Answer If Are you a student or professional member of your selected organizations? Professional member Is Selected

Q12 Of the options listed below (same as previous question), is there a role in which you have interest for switching into? Please select only one option.

- ❍ In design or development in industry within your engineering discipline
- ❍ At a not-for-profit organization doing community development work
- ❍ As a teacher in an engineering-related subject (e.g. math, science)
- ❍ As a researcher within your engineering discipline
- ❍ At an engineering firm in a project management role
- ❍ In upper level management at an engineering company
- ❍ In the military as an engineer
- ❍ In a role concerning public policy, government, or law
- ❍ In a role other than engineering design, research, or management
- ❍ Not working full time by choice
- ❍ As a graduate student within engineering
- ❍ As a student using your engineering degree as a stepping stone to a different professional degree (e.g. medicine, law, business)
- ❍ I have no interest in switching roles

Q13 Do you consider yourself to be an engineer?

- ❍ Yes
- ❍ No
- ❍ In some ways yes, and some ways no

Q14 We list a number of personality traits that may or may not apply to you. Please indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Extraverted, enthusiastic	❍	❍	❍	❍	❍	❍	❍
Critical, quarrelsome	❍	❍	❍	❍	❍	❍	❍
Dependable, self-disciplined	❍	❍	❍	❍	❍	❍	❍
Anxious, easily upset	❍	❍	❍	❍	❍	❍	❍
Open to new experiences, complex	❍	❍	❍	❍	❍	❍	❍
Reserved, quiet	❍	❍	❍	❍	❍	❍	❍
Sympathetic, warm	❍	❍	❍	❍	❍	❍	❍
Disorganized, careless	❍	❍	❍	❍	❍	❍	❍
Calm, emotionally stable	❍	❍	❍	❍	❍	❍	❍
Conventional, uncreative	❍	❍	❍	❍	❍	❍	❍

Q15 Pretend you are going to volunteer for community service sometime in the next year. In this case, community service is defined as a project in which you would volunteer at least twice a month for a couple of hours and use your skills and knowledge (i.e. more than just a one-time volunteer event). Please indicate the extent to which you agree with the following statements.

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I feel bad about the disparity among community members	❍	❍	❍	❍	❍	❍	❍
I feel bad that some community members are suffering from a lack of resources	❍	❍	❍	❍	❍	❍	❍
When I meet people who are having a difficult time, I wonder how I would feel if I were in their shoes	❍	❍	❍	❍	❍	❍	❍

Q16 How likely is it that you will participate in a community service project in the next year?

- ❍ Very Unlikely
- ❍ Unlikely
- ❍ Somewhat Unlikely
- ❍ Undecided
- ❍ Somewhat Likely
- ❍ Likely
- ❍ Very Likely

Q17 We are interested in different learning outcomes from your engineering experience (including education, internships, work experience, and extracurricular activities). Please rate your ability to do the following.

	No ability	Some ability	Adequate ability	More than adequate ability	High ability
Use basic scientific principles to analyze the performance of processes and systems	❍	❍	❍	❍	❍
Use basic engineering principles to analyze the performance of processes and systems	❍	❍	❍	❍	❍
Formulate and evaluate mathematical models describing the behavior and performance of systems and processes	❍	❍	❍	❍	❍
Design an experiment	❍	❍	❍	❍	❍
Analyze evidence or data from an experiment	❍	❍	❍	❍	❍
Interpret results of an experiment	❍	❍	❍	❍	❍
Use evidence to draw conclusions or make recommendations	❍	❍	❍	❍	❍
Identify essential aspects of the engineering design process	❍	❍	❍	❍	❍
Apply systematic design procedures to open-ended problems	❍	❍	❍	❍	❍
Design solutions to meet desired needs (within realistic constraints)	❍	❍	❍	❍	❍
Work in teams where knowledge and ideas from many disciplines (business, public policy, engineering, etc.) must be applied	❍	❍	❍	❍	❍
Work in teams where knowledge from many engineering disciplines must be applied	❍	❍	❍	❍	❍
Effectively manage conflicts that arise when working on multidisciplinary teams	❍	❍	❍	❍	❍
Identify problems for which there are engineering solutions	❍	❍	❍	❍	❍
Formulate a range of solutions to an engineering problem	❍	❍	❍	❍	❍
Test potential solutions to an engineering problem	❍	❍	❍	❍	❍
Identify ethical dilemmas in engineering practice	❍	❍	❍	❍	❍
Address ethical issues when working on engineering problems	❍	❍	❍	❍	❍
Apply technical codes and standards	❍	❍	❍	❍	❍
Convey technical ideas in writing	❍	❍	❍	❍	❍

Convey ideas verbally	❍	❍	❍	❍	❍
Convey ideas in formal presentations (to engineering and non-engineering audiences)	❍	❍	❍	❍	❍
Estimate the impact of engineering solutions in a societal context (in a particular culture, community, state, nation, etc.)	❍	❍	❍	❍	❍
Estimate the impact of engineering solutions in a global context (including environmental and economic contexts)	❍	❍	❍	❍	❍
Apply engineering techniques (e.g., processes, methods) in engineering practice	❍	❍	❍	❍	❍
Apply engineering skills (e.g., experimentation, matching, programming) in engineering practice	❍	❍	❍	❍	❍
Apply engineering tools (e.g., software, lathes, oscilloscopes) in engineering practice	❍	❍	❍	❍	❍
Manage a team's time to meet deadlines when leading a project	❍	❍	❍	❍	❍
Create and follow a budget when managing a project	❍	❍	❍	❍	❍
Address the business, financial, and market related matters associated with project engineering	❍	❍	❍	❍	❍
Apply interpersonal skills in managing people	❍	❍	❍	❍	❍
Integrate knowledge and skills learned in engineering disciplines other than your specific major	❍	❍	❍	❍	❍
Recognize the need to consult an expert from a discipline other than your own when working on a project	❍	❍	❍	❍	❍
Consider contemporary issues (economic, environmental, political, aesthetic, etc.) at the local, national, and world levels	❍	❍	❍	❍	❍
Estimate how engineering decisions and contemporary issues can impact each other	❍	❍	❍	❍	❍
Use knowledge of contemporary issues to make engineering decisions	❍	❍	❍	❍	❍

Q18 To what extent are you/do you:

	Not at all	Somewhat	Mostly	Always
Set and pursue your own learning goals	❍	❍	❍	❍
Take new opportunities for intellectual growth or professional development	❍	❍	❍	❍
Engage in critical, reliable, and valid self-assessment	❍	❍	❍	❍
Recognize the unique skills, abilities, and attributes of all students/colleagues in your engineering course/practice	❍	❍	❍	❍
Recognize the need for diverse perspectives in solving engineering problems	❍	❍	❍	❍
Comfortable working with engineering clients and colleagues from diverse racial/ethical backgrounds	❍	❍	❍	❍
Comfortable working with engineering clients and colleagues of the opposite gender	❍	❍	❍	❍

Q19 In your engineering work, how often do you do the following? (Think of past year)

	Almost never	Occasionally	Often	Almost always
Take initiative to learn on your own	❍	❍	❍	❍
Seek ways to improve a design or project, even after it has been submitted	❍	❍	❍	❍
Complete your share of tasks on time, when working in teams	❍	❍	❍	❍

Answer If Of the organizations listed below, with which are you involved? (Select all that apply) Engineers Without Borders-USA - Official member Is Selected And Are you a student or professional member of your selected organizations? Student member Is Selected

Q20 Please indicate how helpful your EWB experience was compared to your coursework learning (CL) in enabling you to achieve the following skills. Move the sliding bar to indicate the percent impact from EWB, as compared to coursework learning. Ex. 60% indicates that 60% of a skill was learned through EWB while 40% was learned through coursework.

_____ Apply math, science, and engineering knowledge
_____ Design a system, component, or process to meet desired needs
_____ Design an experiment
_____ Analyze and interpret data
_____ Apply techniques, skills, and modern engineering tools in practice
_____ Conduct (or simulate) an experiment
_____ Communicate effectively with others
_____ Operate in the unknown (i.e. open-ended problems)
_____ Function within a team
_____ Engage in critical, reliable, and valid self-assessment
_____ Persevere to complete an engineering design task
_____ Maintain a strong work ethic throughout an engineering project design
_____ Understand the impact of your engineering design/solution in a societal and global context
_____ Identify potential ethical issues and dilemmas of a project
_____ Recognize the need for life-long learning

Q21 We are interested in knowing why you chose engineering as an area of study. Please indicate below the extent to which the following reasons apply to you.

	Not a reason	A minor reason	A moderate reason	An important reason	An extremely important reason
I think engineering is fun	❍	❍	❍	❍	❍
I like to build stuff	❍	❍	❍	❍	❍
I feel good when I am doing engineering	❍	❍	❍	❍	❍
I like to figure out how things work	❍	❍	❍	❍	❍
I think engineering is interesting	❍	❍	❍	❍	❍
A mentor encouraged and/or inspired me to study engineering	❍	❍	❍	❍	❍
A mentor introduced me to people and opportunities in engineering	❍	❍	❍	❍	❍
Technology plays an important role in solving society's problems	❍	❍	❍	❍	❍
Engineers have contributed greatly to fixing problems in the world	❍	❍	❍	❍	❍
Engineering skills can be used for the good of society	❍	❍	❍	❍	❍
Engineers are paid well	❍	❍	❍	❍	❍
An engineering degree will/would guarantee me a job after graduation	❍	❍	❍	❍	❍
Engineers make more money than most other professionals	❍	❍	❍	❍	❍
My family wanted me to be an engineer	❍	❍	❍	❍	❍
My family would have disapproved if I chose a major other than engineering	❍	❍	❍	❍	❍
Engineers Without Borders or a similar type of work interested me	❍	❍	❍	❍	❍
I wanted to use engineering to do community development projects around the world	❍	❍	❍	❍	❍

Q22 How much do you need/expect to incorporate the following skills in your own engineering career?

	Not at all Important	Somewhat important	Moderately important	Very Important	Crucial
Problem solving	❍	❍	❍	❍	❍
Hands-on application	❍	❍	❍	❍	❍
Ability to work in teams	❍	❍	❍	❍	❍
Technical skills	❍	❍	❍	❍	❍
Creativity	❍	❍	❍	❍	❍
Life-long learning	❍	❍	❍	❍	❍
Awareness of engineering impact	❍	❍	❍	❍	❍
Project management skills	❍	❍	❍	❍	❍
Interpersonal skills	❍	❍	❍	❍	❍
Communication skills	❍	❍	❍	❍	❍
Societal awareness	❍	❍	❍	❍	❍
Global perspective	❍	❍	❍	❍	❍
Networking	❍	❍	❍	❍	❍
Humanitarian emphasis	❍	❍	❍	❍	❍
Non-technical subjects	❍	❍	❍	❍	❍

Answer If Are you a student or professional member of your selected organizations? Student member Is Selected

Q23 In your education, including both inside and outside of the formal classroom, have you had the following experiences within engineering?

	No, never	Yes, once	Yes, multiple times
Hands on application of skills and knowledge	❍	❍	❍
Seeing a project through completion	❍	❍	❍
Teamwork	❍	❍	❍
Interdisciplinary teamwork within engineering	❍	❍	❍
Interdisciplinary teamwork beyond engineering disciplines	❍	❍	❍
Leadership or project management experience	❍	❍	❍
Communication with or to non-technical audiences	❍	❍	❍
Access to mentors and/or networking	❍	❍	❍
Travel and/or cultural diversity	❍	❍	❍
Seeing the social impact of your work	❍	❍	❍
Facing ethical dilemmas	❍	❍	❍

Q24 Please indicate whether or not you have done the following activities. If you have done a certain activity, please select whether or not you have done this once or more than once.

	No	Yes, once	Yes, more than once
Have you traveled to a country that most people would classify as 'developing'?	❍	❍	❍
Have you traveled to a country that does not speak your mother tongue?	❍	❍	❍
Have you held a job in or been a student in a country other than your home country?	❍	❍	❍
Have you worked on an engineering project where you traveled to another country?	❍	❍	❍
Have you worked on an engineering project that took place in another country where travel was not necessarily required?	❍	❍	❍
Have you worked on an engineering project with people from multiple countries?	❍	❍	❍

Q25 How many countries have you traveled to other than your home country?
- ❍ Never
- ❍ One other country
- ❍ 2-5 other countries
- ❍ 6-9 other countries
- ❍ 10 or more other countries

Q26 How many times (independent trips) have you traveled to a country other than your home country?
- ❍ Never
- ❍ One time
- ❍ 2-5 times
- ❍ 6-9 times
- ❍ 10 or more times

Q27 What is your level of experience in studying about countries or cultures other than your own? Use your own discretion as to what types of courses may count (e.g. language, world geography, international policy courses, etc.)
- ❍ Never took a course
- ❍ Took one course
- ❍ Took multiple courses
- ❍ Minor or certificate
- ❍ Bachelor's Degree
- ❍ Master's Degree or Multiple Bachelor's Degrees
- ❍ PhD or expert level

Q28 How many languages other than your mother tongue can you speak fluently?
- ❍ None
- ❍ 1
- ❍ 2
- ❍ 3 or more

Q29 Approximately how long (in total) have you spent time in another country other than your home country?
- ❍ Never
- ❍ 1 to 2 weeks
- ❍ 1 to 2 months
- ❍ About 6 months
- ❍ About one year
- ❍ 2 to 3 years
- ❍ About 5 years
- ❍ 8 or more years

Q30 Overall, how would you rate your:

	Non-existent	Below Average	Average	Strong	Very Strong
Interest in global matters?	❍	❍	❍	❍	❍
Knowledge of global matters?	❍	❍	❍	❍	❍

Q31 Please write in your year of birth.

Q32 What gender do you associate yourself with?
- ❍ Male
- ❍ Female
- ❍ Prefer not to answer

Q33 What is your current working status?
- ❍ Undergraduate student
- ❍ Graduate student
- ❍ Practicing professional
- ❍ Academic
- ❍ Retired
- ❍ Other
- ❍ Unemployed by choice

Answer If What is your current working status? Unemployed by choice Is Selected

Q34 Please share why you have decided to be unemployed by choice._____

Answer If What is your current working status? Undergraduate student Is Selected

Q35 What year are you in your undergraduate degree?
- ❍ Freshman
- ❍ Sophomore
- ❍ Junior
- ❍ Senior
- ❍ Fifth year senior or more

Q36 How many years have you worked professionally in an engineering-related field?

Q37 Do any of your immediate family members (i.e. parents, siblings) hold an engineering degree?

- ❍ Yes
- ❍ No
- ❍ Uncertain

Q38 What is/was your approximate college GPA during your engineering studies? (Please estimate on a 4.0 scale)

- ❍ A or A+ (i.e., 3.9 or above)
- ❍ A- (3.5-3.8)
- ❍ B+ (3.2-3.4)
- ❍ B (2.9-3.1)
- ❍ B- (2.5-2.8)
- ❍ C (2.2-2.4)
- ❍ C- or lower (1.9-2.1)
- ❍ Not applicable, no engineering degree

Q39 Are you a citizen of the United States?

- ❍ Yes
- ❍ No
- ❍ Prefer not to answer

Q40 What is your race/ethnicity?

- ❍ American Indian or Alaskan Native
- ❍ Asian or Asian American
- ❍ Black or African American
- ❍ Hispanic or Latino/a
- ❍ Native Hawaiian or Pacific Islander
- ❍ White
- ❍ Other
- ❍ Multiracial
- ❍ Prefer not to answer

Q41 Thank you for completing our survey! If you would like to be entered into our raffle to win either an iPad or one of several $10 Amazon gift cards, please leave your preferred email address. This information will not be connected to your responses, which remain confidential, and it will only be used for raffling purposes.

Email Address:_____