

## **Engineering Graduate Education: An Overwhelming Journey of First-Generation Immigrants**

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## **ABSTRACT**

Engineering graduate programs in the United States are usually diverse. Students with different nationalities, races, ethnicities, genders, and religions work and collaborate with each other in classes, labs, and research projects. Graduate education often is called a transformative experience, in which students will have the opportunity to grow both professionally and personally. However, for many students, given their diverse backgrounds, the status quo culture in academia, and the long-term pressure, graduate education may become extremely overwhelming and frustrating. In order to support and help the transformation of students, it is important to explore the challenges that students face, and the potential support they can receive accordingly. In this paper, we aim to share the experiences of engineering graduate students who are first-generation immigrants. To reach this aim, we utilize a cooperative inquiry in which multiple people share and explore a topic from their own perspectives. The exploration happens through collective conversation and reflection of the authors as well as over ten other graduate students. The students and us share the same nationality, religion, and language. We are at different levels of our doctoral program in different engineering majors. The findings we share in this paper are the accumulation of all stories we heard, reflections on the stories, and our own experiences. This cooperative inquiry process can serve as a guide for other graduate students in discovering their personal journey during their graduate years. In addition, the findings can provide insights for university administrations and policymakers to ease this transformation process, especially for immigrant students.

**Keywords:** *Graduate school, cooperative inquiry, immigration, policy, administration.*

## **INTRODUCTION**

When students start graduate school, they know they are stepping on a challenging and overwhelming path. On the other hand, immigration is also a new life adventure, which everyone might not know about all of its various aspects. Immigrants leave behind a community that they share history, culture, language, and beliefs with for the hope of a brighter future. Immigrants chase a “better future” full of ups and downs; however, it is not easy to imagine the variety of experiences that immigrants face, especially the ones who start graduate school right away: What do their experiences look like? What possible challenges do they face? How do they manage to overcome those challenges? Do they see any privilege for being an immigrant graduate student?

We, a group of former and current graduate students and first-generation immigrants, recognized the need to respond to these questions. To be able to picture this journey, we reflected on our own “story”, listened to the stories of others with similar identities as ours, and shared our personal experiences in engineering graduate schools in the United States. Believing in the power of storytelling in engineering education (Adams et al. 2007), we conceptualize “story” as a way of capturing who we are and understanding our transition process and possible growth. We believe that the experience of being a graduate student is as much a personal journey as it is a professional chase. Therefore, the aim of this study is to examine our personal stories in relation to our professional lives. We aim to document and share the challenges that international, immigrant students went through during their experiences in engineering programs in the United States. Our findings can serve as a guide for other immigrant graduate students during their graduate studies; more importantly, the outcome of this study can provide insights for university administrations and policymakers to help immigrant students have a less volatile transformation in this process.

## **IMPORTANCE OF THE TOPIC — WHY IS IT WORTHWHILE TO EXPLORE OUR JOURNEY?**

It has long been known that immigration is one of the significant readjustment life events with long-term effects (Holmes and Rahe 1967), let alone if the immigration is being forced on individuals. Immigration is a multi-facet life event with numerous unknown variables. The regular immigration process does not take place at one night, rather it requires short-term and long-term planning: planning for learning the native language of the destination country, dealing with the fact that you are going to leave behind your country, your relatives, and your close friends, planning for selling your belongings and looking for a place to live your new life at, quitting your current job and finding a job (temporary or permanent) at the destination country, and so on. In this volatile process, some marriages would even end in divorce if one partner does not support the idea of immigration. Imagine if children are involved in this maze.

Research scholars in the area of Public Health and Psychosocial Behavior have performed studies on the mental health level of immigrants. Filion et al. (2018) carried out a quantitative analysis using the National Health Interview Survey on “the Strength and Difficulties Questionnaire.” Comparing the responses from foreign-born non-citizens and U.S.-born citizens, they found that immigrant adolescents experience relatively more long-term emotional difficulties when compared to U.S.-born citizens (Shekunov 2016). Eskenazi et al. (2019) found a strong relationship between the perceived immigration policy vulnerability on the mental and physical health of U.S.-born Latino adolescents. Alegría et al. (2018) devoted a review study to examine the role of social resilience in the migration-environment nexus. They categorized some known prevalent psychiatric disorders as follows: depressive disorders, anxiety disorders, substance use

disorders, psychotic disorders, and suicidality. They believe that there are some factors that may alleviate the side effects of immigration such as family context, social position and social capital, neighborhood context, social support and social exclusion, and transitional ties.

Szaflarski et al. (2017) found that immigrant background plays a crucial role in immigrants' anxiety disorders. Observing the National Epidemiological Survey on Alcohol and Related Conditions, they estimated the rates of anxiety disorders by nativity and racial-ethnic origin while adjusting for acculturation, stress, social ties, and sociodemographics. In their comprehensive study, “psychological implications of racism, discrimination, and racial profiling” were found to be the main problems that immigrants deal with.

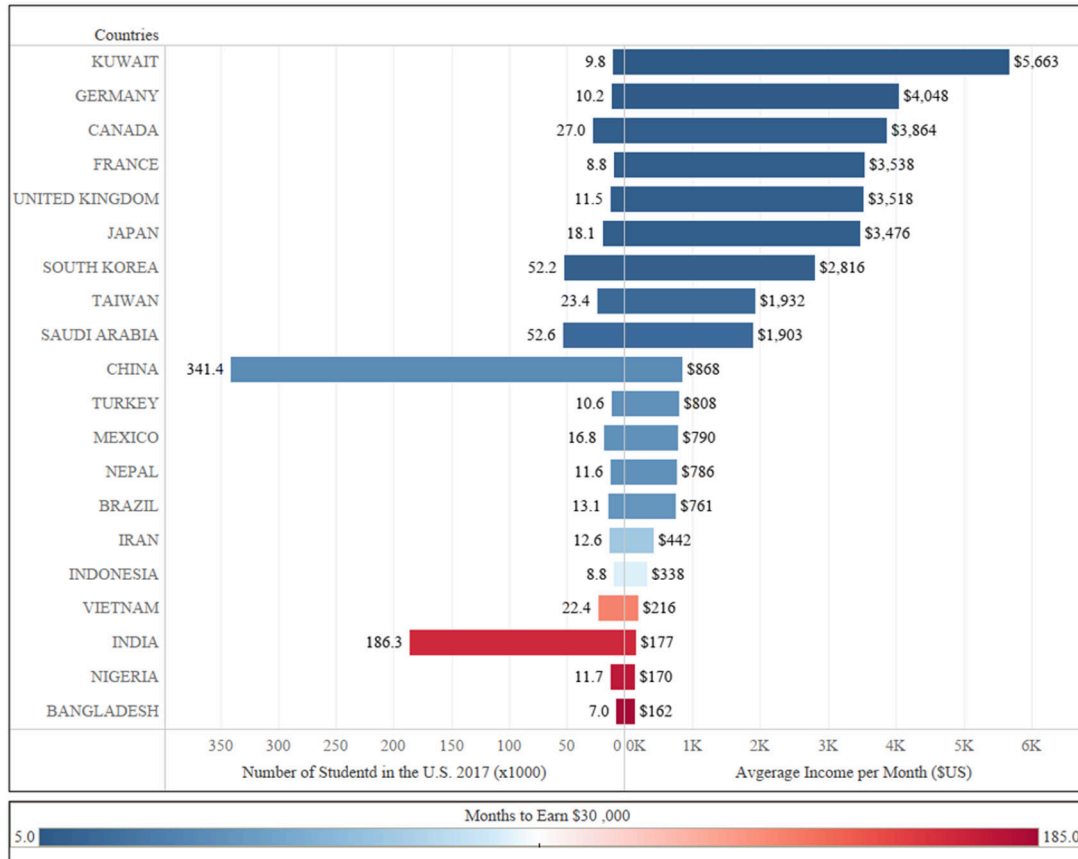
There are many other research studies on immigrants and their myriad difficulties, and mental and health issues (Breslau et al. 2011; Williams et al. 2007; Williams et al. 2003; Vega et al. 1998; Acevedo-Garcia 2005), however, to the best of our knowledge, there is no study on the challenges that engineering graduate student immigrants deal with before, during, and after their studies. Therefore, in this paper, we aim at investigating some of the main hurdles and difficulties that we have encountered, and we aim at providing solutions for alleviating the issues. We hope that this paper gives university administrations and policymakers some insights on how to revise or improve their status quo policies in order to help immigrant students overcome the downsides of immigration and graduate school.

## **DEMOGRAPHICS OF IMMIGRANTS AND STUDENTS**

282.4 million U.S.-born and 44.7 million foreign-born individuals (13.7% of the U.S. population) are known to reside in the U.S. in 2018. This number for Indiana is 6.3 million U.S.-born versus 0.3 million foreign-born individuals (5.3% of the state population). California is reported to have 28.9 million U.S.-born and 10.6 million foreign-born residents (26.9% of the state population) (Ruggles et al. 2018).

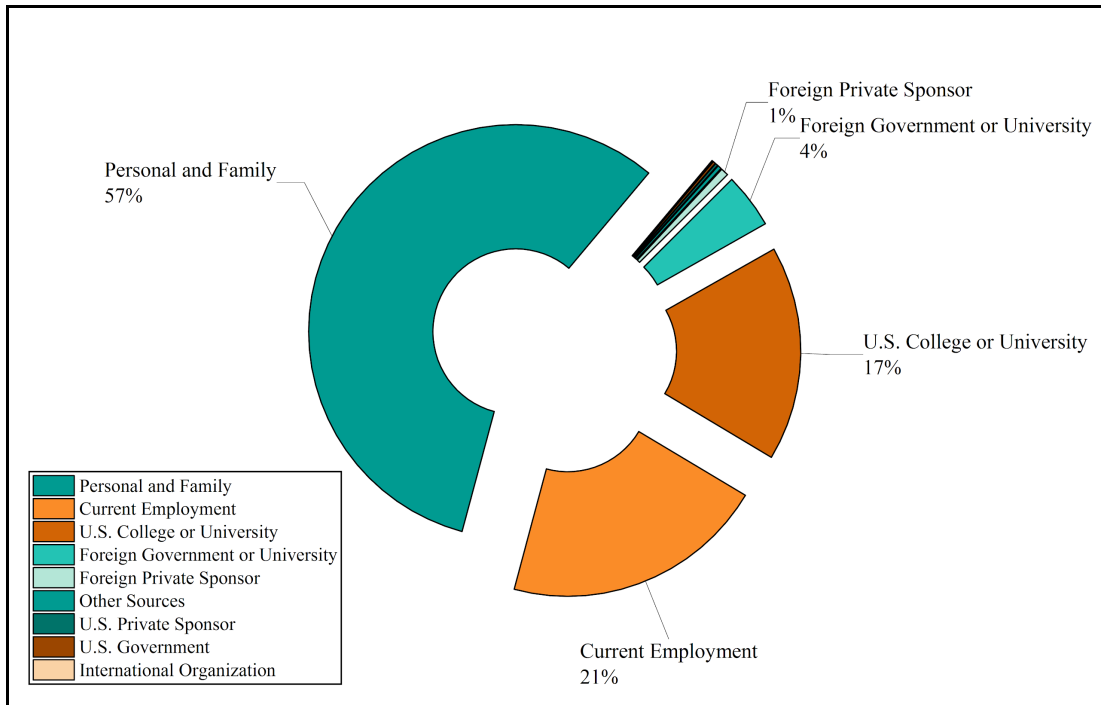
As far as the demographics of students at colleges and universities, about 19.9 million students enrolled in colleges and universities in Fall 2019 (16.9 million students in undergraduate and 3.0 million students in graduate programs - 12.1 million full-time and 7.8 million part-time students.) Among those, the total number of international students in AY 2018-2019 is known to be a little over 1 million students (1,095,299 individuals), which contributed about \$44.7 billion to the U.S. economy in 2018 (IIE 2019). China with 0.34, India with 0.18, Saudi Arabia with 0.05, South Korea with 0.05, and Canada with 0.02 million students are among the top five countries with the highest number of students in the United States. Iran, specifically, has about 12,600 students in the US. Figure 1 shows the heatmap of the population of international students in the U.S. versus the home countries' average income per month (\$US) (AIM). Assuming the average tuition of \$30,000 per year for the U.S. colleges, the average time to earn \$30K in one year for each country was calculated based on the AIM values. The dark blue color in the figure indicates that the people in that country can earn \$30,000 in 5 months. The dark red color in the figure denotes that it takes 185 months (more than 15 years) to earn \$30,000.

Among the graduate students, ~0.4 million international students were in graduate programs (AY 2016-2017) (MPI 2018), and in AY 2017-2018, 0.82 million master's degrees and 0.18 million doctoral degrees were awarded (NCES 2019). In this paper, we are telling the story related to this significant portion of graduate students in the U.S.



**Figure 1. Heatmap of the number of students in the U.S. (NCES 2019) vs. the countries' average income per month (\$US) in 2017 (worlddata.info 2018)**

Figure 2 demonstrates the pie chart for funding resources for international students in the U.S. According to the figure, a significant portion of the funding resources is provided by students and their families (out-of-pocket). There are 1.1 million international students in the U.S. in 2019-2020 (MIP 2018), which translates into a total amount of \$18,800 million tuitions per annum paid by students and their families. Although this is an incredible business and revenue for the U.S., providing this amount of fortune by international students is a true burden for them and for their families. The “U.S. College and Universities” - with a 17% portion of the funding resources - can be a great resource for students looking for fellowships, TA, RA, or GA positions, however, most of the time it gets considerably competitive to find the position that matches a student's preferences. Also, it is highly likely that some departments do not offer those positions to international students in the acceptance letter. This alone increases the chance of getting VISA rejections since the embassies ask for a “proof of income” that can cover tuition, living expenses, etc. for at least a year.



**Figure 2. Funding resources for international college and higher education in the U.S. in 2020 (MPI 2018)**

## RESEARCH METHODOLOGY

Inspired by the Ehsan et al. (2019) study, in this paper we used the cooperative inquiry as our methodology. Cooperative inquiry is a methodology, drawn from autoethnography, and is used to make meaning of experiences through storytelling and reflecting on our stories. In this type of inquiry, a group of researchers form an inquiry group and conduct research on a topic grounded in their own experiences, and move between cycles of reflecting and experiencing. Each researcher becomes co-subject in the experience phases and co-research in the reflection phases (Heron 1996). Decisions about research should be made collectively through a cyclical process of conversation and dialogue. Below, we describe the process of conducting this study.

Researchers are the subjects of the inquiry themselves. In a co-inquiry research, researchers become conscious of the component of their life, which helps them gain a deeper understanding of themselves as a person and their cultural environment. Discussions on personal life being interrelated to professional life show that both can have the same importance in one's life. According to (Dall'Alba 2009), personal development is as important as professional learning of knowing and acting. In the context of immigration, personal development can be even more important due to the fact that the process of adaptation to a new setting is required to live in that new setting. We believe this type of research that is driven by personal stories is important since it can help future students with similar experiences expect what they should be expecting.

In this study, we aimed to examine our previous and current experience of being graduate student immigrants in engineering schools in the United States. We intended to explore our stories and look for what we have in common and what aspects of our stories are unique to ourselves as individuals. We started our graduate school right after we immigrated to the U.S. We all share nationality, religion, and language. We grew up in different cities, and the structures of our families

are different, however, we identify ourselves to be culturally similar. We are/were enrolled in different engineering disciplines including Engineering Education, Civil Engineering, and Electrical and Computer Engineering. We are at different levels of graduate studies: one graduated with a Ph.D., one is in the sixth year of a doctoral program, and two are in the fifth year. We did our master's at different schools (three got Master's in the USA, and one in a different country). The stories that we share reflect our experiences at both doctoral and master's programs that we attended in the US.

After we formed our core inquiry group, we first met and made several decisions on how to proceed with the objectives of the research. Our first decision was to engage in exploring our own stories as well as ten other graduate immigrant students who shared the three main components of nationality, language, and religion with us. We then set goals for what we would like to explore in our stories. We defined what we mean by "story" and the timeline we would like to capture our stories: we defined "story" as everything that we have experienced in our personal and professional life related to graduate school in the United States. We agreed to set the starting point of our story from the day we entered the United States, as we have called ourselves "immigrants" since then. The last day was the day we submitted this paper. This decision was made as we believed that we cannot predict our future and some highlights may be added to our story as we get closer to the due date of the paper submission.

After we agreed on the logistics of the research group, we individually brainstormed different topics that we would tell our story about. To brainstorm ideas, we set a two-week period to think about our story across the timeline and reflect on the moments that had influenced our life both personally and professionally. Then, we shared our ideas, collectively grouped them into categories, and discussed the associated solutions that could help university administrations and education policymakers revise or improve the status quo regulations.

We also agreed to consult our stories and reflections with at least ten others, with whom we shared similar identities. We asked the students if our stories resonated with them or if those are in conflict with their experiences, and we encouraged them to share theirs if they felt comfortable. At least two members of the core inquiry group (i.e. authors) sat with one individual student and had the conversation in an informal setting. Thus, we captured their experiences by taking notes, and confirmed with them to make sure we did not misinterpret their stories. Examples of their stories along with ours are included in the discussion section of this paper.

## **IMPLICATION OF THIS STUDY**

The structure of this paper with the importance of each subsection is denoted in Table 1. The inquiries are divided into "Personal Life", "Religion", and "Professional Life." The items related to the "Personal Life" that sounded crucial to the authors to discuss are as follows: nationality, visa, travel ban/politics, cultural differences, and language barriers. The items related to "Religion" are divided into minorities and stereotypes. And, for the "Professional Life", we included adviser-advisee relationship, international students' affairs/internship (e.g. name discrimination in job applications), and scholarships/salaries. We believe that this examination provides a thorough perspective and insights for faculty members, university staff, graduate students, undergraduate students, and policymakers as to what international graduate students might have gone through until they are placed in their current positions, and how they might think about their surroundings and the various relationships that they have experienced as graduate student immigrants.

The Priority column in Table 1 shows the average importance level of the inquiries that we identified on the personal life, religious matters, and professional life of the authors (1-lowest to

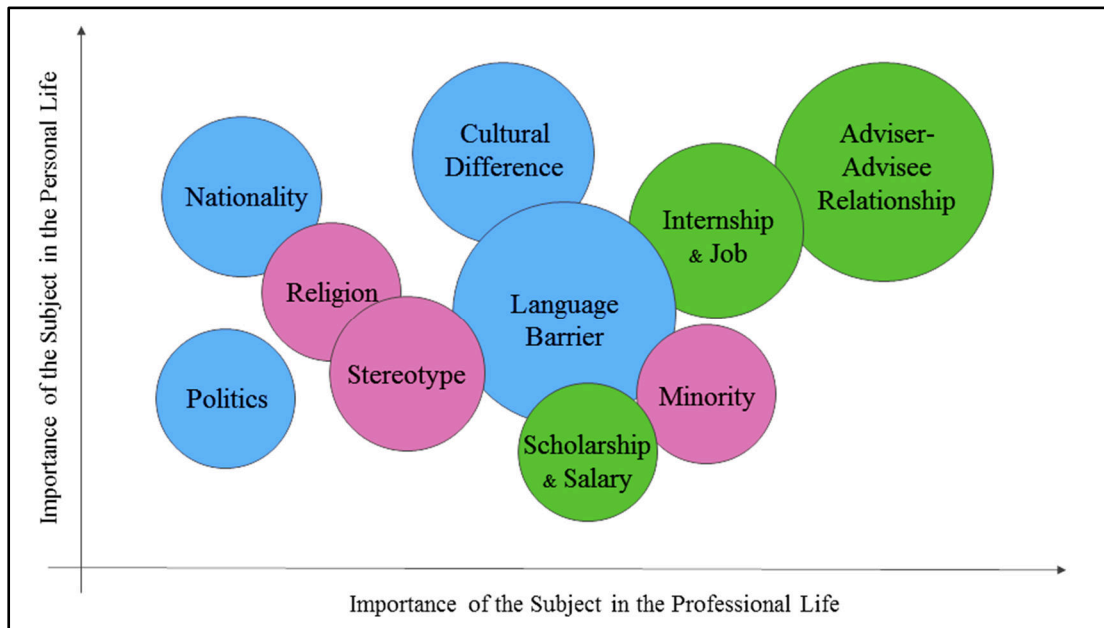
5-highest). The Importance Size column in Table 1 denotes the average intensity of the importance of the inquiries on the personal life, religious matters, and the professional life of the authors (1-lowest to 10-highest). In Figure 3, the position of each subject matter with respect to its priority and importance size has been illustrated. The reason for each ranking is comprehensively discussed where we expand the inquiries into three stages of our graduate program timeline. The stages are labeled as “(B) - Before,” “(D) - During,” and “(A) - After,” which demonstrates the time when we were applying to graduate programs, while we were studying at the graduate programs, and what we anticipate pursuing after our graduation, respectively.

**Table 1. Categories of the subject matters**

	Priority	Importance Size
<b>Personal Life</b>		
Nationality (B, D, A)	5	4
Visa (B)	4	4
Travel ban / Politics (D)	3	5
Cultural differences (D, A)	2	5
Language barrier (B, D, A)	1	10
<b>Religion</b>		
Minority (D, A)	2	5
Stereotype (D, A)	1	5
<b>Professional Life</b>		
International students’ affairs/ internship (Name discrimination in job applications) (D, A)	3	7
Scholarships/salary (D)	2	9
Adviser-advisee relationship (D)	1	9

*Note: (B) - Before, (D) - During, and (A) - After denote the periods that the effect of each subject is significant.*





**Figure 3. Illustration of the importance of the subject matters**

## DISCUSSION

In this section, we discuss each subject in detail within each stage mentioned above. The stages are as follows: “Before Beginning the Graduate Programs,” which covers the period that we were applying to graduate programs. “During the Programs,” which includes the period that we were studying at the graduate programs. What we share below includes the reflections, concerns, and stories of the core inquiry team as well as the ten other students who participated in this study. Depending on each section’s content, we share concrete examples, quotes, and suggestions, or web content the discussion with an overall discourse.

### **Before Beginning the Programs – While Applying to Graduate Programs**

Individuals are raised by the assets of their home countries, and when they get to the point to “payback” all that they have received through the years, they think about leaving their countries for better education, a better life, an adventure, etc. This normally happens around their 20s: a young adult, full of passion and energy, starts the journey.

When coming to the applying stage, there are numerous roadblocks. One big hassle is that there is no US embassy in our country. We have to travel to a third country to apply for a visa. This and many other disadvantages such as long-distance, visa clearance uncertainties, currency volatility, etc. push students to apply to universities in Europe. For one of the authors, Europe was not a preferable choice though. As a woman wearing a hijab, she did not have a good experience while visiting some European countries for academic conferences. She experienced racism and faced people who were reluctant to assist her because of her dress code. Due to the fact that the U.S. is a country with many nations, and that people respect religions and beliefs, she decided to apply to the graduate schools in the U.S.

Another hassle for international students is to provide both official transcripts and diplomas to the embassy and the graduate school. It has to be noted that sometimes the bureaucratic system

in developing countries would not allow students to acquire the official documents in a timely manner, therefore, they may miss deadlines. This may cause a considerable amount of stress for students, accordingly. Therefore, we suggest that revisions be made to the unnecessary requirements for the university applications.

There are a lot of unknown variables, especially when applying from abroad. Students who apply from the U.S. have the advantage of attending “Open House” events, for instance, where they can develop their own “network” to find the best possible options. Undergraduate students in the U.S. have a sense of what a comprehensive “Statement of Purpose” or other required essays are, whereas, for many foreign students, this is a new concept. Most of the time, the criteria for essays have not been fully addressed on university websites, therefore, it is considerably challenging to write essays that can lead you to better scholarships, programs, fellowships, advisors, etc. Recently, universities have started publishing useful videos for prospective students, which helps international students in multiple aspects of applying to graduate schools. Social media has helped students in getting to know more about university activities, potential scholarship positions, graduate assistantship positions, and entrepreneurship activities, however, there is still a lack of transparency in broadcasting the funded positions to all graduate students.

Taking TOEFL and GRE tests is another roadblock. Considering the exchange currency volatility in developing countries, it is a big portion of the liquidity of students to pay for the TOEFL and GRE tests. Many of us have to take high APR loans to pay for the exams. If we do not get good grades, then another loan will be needed to retake the tests. It is unfortunate that more countries such as India, Ghana, and Nigeria, are gradually forgetting their mother tongues and abandoning their native languages, and speak English as their “first language.” However, many countries still do not have this “privilege.” Moreover, in many countries, dual language kindergartens are not common yet, therefore, students face a considerable language barrier, especially in speaking and writing skills. Easing some of the TOEFL and GRE criteria for university applications would be inclusive in this regard.

## **During the Program – While Studying at the Graduate Program**

### *Funding Issues*

For the many U.S. citizens and permanent residents, acquiring student loans, such as the free application for federal student aid (FAFSA) is an easy resort to pay for their college expenses and tuition fees. However, this is not an option for international students. Moreover, there are numerous awards and scholarships for the two aforementioned groups, which international students are deprived of receiving. This makes their journey even more breathtaking.

Not all of the students can get guaranteed funding support from the schools, and even if they hold a teaching assistant, research assistant, or graduate assistant position, there is always a possibility that the advisor or the school terminate the position. Advisers are already aware of the fragility of the VISA status and money dependency of international students. Therefore, some can use it as powerful leverage to force students to work more than they should, i.e. more than 40 hours per week. Human Resources of universities do not want to step in and watch the possible injustices to students - due to the fact that there is no “student union” in place. Unfortunately, other university administrations, such as universities’ ombuds do not actively do surveillance of such issues.

Aside from two of the students, most of the students whom we heard their stories shared concerns about having funding issues, which are noted below. However, two other students, who

happened to be from the same department, noted that their faculty actively make sure all students have funding; so they never felt any threat regarding their financial status.

“After getting admitted to my master’s degree university, I was invited to work at his lab. I was verbally promised that I would get an RA position and a supplement for my work. However, after working in the lab for a while, I was told that I can not be paid and will not be receiving any funds. Due to the fact that I was not familiar with the laws, and no “student union” in place, I stayed working at the lab. I thought that if I quit, I would lose my VISA status. Miscommunication and cultural differences with my advisors were always a barrier. Since I was not familiar with my rights as a student; moreover, my advisor was the department’s head, therefore, I never thought of taking any actions.”

Some of the students mentioned having the fear that if they do not “obey” their advisers, their whole future will be jeopardized. Therefore, they just followed what they were being told to do so. Accordingly, this caused severe health issues, including mental health issues, malnutrition, family relationship issues, etc.

“I had to keep the tuition for one year in my bank account, just in case, I would need to self-fund my studies. Also, I had to reduce my quality of life to be able to save more money each month. That included being stingy on even buying medicine when I was terribly sick.”

“A few months after I started my education, my RA funding discontinued unexpectedly, and my fellowship that was conditional on receiving an RA position from the department was terminated, accordingly. In such a situation, one may decide to go back to their home country to stop losing more money. Some may stay and ask for help from their family (not an option due to the political and financial sanctions), community, funding agencies, non-U.S. scholarships, or apply for university jobs (that do not need a work permit). However, all of those would take a considerable amount of time, and one may need to stay self-funded for a few months. Many times, I decided to drop out of school and go back to my home country. I never knew when I could resolve my funding issue, and paying the tuition on my own was more than all the money I had brought with me to the U.S. I remember those days that I had to minimize my living costs by not going to social events that needed tickets, or eating the cheapest meals that I could afford. I was lucky to get a TA offer the next semester and continued to be in the same position for almost my entire program.”

A recommendation for faculty and admin could be guiding their students to other sources of support and be there for them emotionally throughout the stressful times. Faculties also might want to “use” their network and reach out to other faculty members to seek funding opportunities for their students.

### *Language Barrier and Cultural Difference*

Language barriers and cultural differences came up several times in our reflections as well as in the stories of the other ten students. However, they were both intertwined in our reflections and we could not separate them from each other. Thus, we talk about these two important aspects of our lives in this paper.

We all reflected and shared that language barriers have strongly triggered imposter syndrome in us, especially that English is not our native language. We believe that even though we all received high scores in TOEFL and GRE exams, the competencies did not seem to be enough. While over time, we all got better at believing in our capabilities, we began graduate programs feeling that we were less capable among others. We feared that others could not see our potentials because we were not communicating in English as fluently as a native language speaker. We felt the need that the departments needed to provide more resources not only for written and oral communications for ESL students but also ways to present themselves and their unique capabilities. Below we share some of the quotes we heard from the students:

“I am still very cognizant of my accent. I always fear that I make grammatical mistakes as I talk. Like very often I make the mistake of using a plural verb for a singular noun. It’s hard. It doesn’t come naturally to me. I know it might be a small mistake, but I have that in my mind all the time. When I talk, I constantly remind myself to check my verbs - did I use that little ‘s’ at the end of the verb or not?. I fear what if I don’t get it correct during the presentations. Are reviewers going to doubt my capabilities? I am more confident in front of my advisor or others who believe I know my work and I am good at it. But when it comes to new people, I am always worried.”

“Emails are still challenging for me. I still do some rounds of the search for expressions, words/vocabulary, etc. to make sure what I write is correct. I feel like some people already know my capabilities, so they won’t judge me based on my writing style. On the other hand, sometimes I do feel that I don’t want the same people to think that even after so many years, my English is still not as good as others.”

Some other topics that came up in the stories that we reflected on include making friends or teammates, and articulating their needs to others. Not all the students are open about their culture and background, or, they might be shy enough to be willing to start a conversation with other students or with faculty. Therefore, in our view, expanding networks from the very first year and making friends should be a priority for international students. Friendship is vital for mental well-being. It’s essential for self-confidence, feeling supported, and avoiding trauma - when you are homesick, when you are sick, when you need help in difficult circumstances, and you do not have your families next to you. Additionally, given the differences in cultures, sometimes international students may not feel comfortable sharing their personal needs with their friends and/or their peers. As a result, they may struggle in different ways without trying or having any chance to overcome those.

“In my first year of graduate life in the U.S., I had the same problem. I had to find a partner for my class projects, and I had a hard time finding someone to work with me. I was concerned to ask anybody because I was not able to speak English as fluently as they could; besides, I am a religious person and I have a special dress code. Moreover, I had come from a different educational system, and I was not sure if anyone would risk it to collaborate with someone that may not be successful in a new educational system. Hence, all those hesitations in finding partners led to working with the ones that were shy and unmotivated, who had no interests in proceeding the projects.”

“My advisor’s preferable time to meet was at 9 p.m. As I am single, I was afraid to tell him it’s too late for me. So I started adjusting my time. However, during Ramadan, it was too difficult for me to have the meeting at that time. I was too shy to let my advisor know. Also, had I told him so, I was afraid that this would be the only time that might work for others, and I did not want to create any dynamics. Maybe I should have told him and he would just shift the meeting to another time. However, I never shared any of my personal preferences and limitations with him. He only talked about work, so I assumed that I needed to do that too.”

Relevant to imposter syndrome, we believe that many other international students are always afraid of miscommunication:

“I encountered several moments of miscommunication. I think apart from the language barrier, cultural differences play a big role here. Sometimes, I wonder how to express my feelings about my peers and professors that how I am proud of them, how to show my appreciation, etc. There are also some times that I do not know how to elaborate on my requests. I think this might be improved with practices or as our relationship is gradually built among peers and friends. However, it’s challenging, and it hurts when it turns to a misunderstanding.”

“I was told, my accent may be perceived by others that I might know less, so I need to practice more when I present my research. Therefore, I have been very cautious about my accent. I say a word, then I correct the word in fear of mispronunciation. If I say a word and someone asks me to repeat, I lose my self-confidence.”

We reflected on ways we, the authors, overcame the challenges around language barriers/cultural differences. We concluded that we have never become comfortable with the language and cultural differences. However, our struggles got so much better when they were acknowledged by others or we were welcomed to share our struggles.

“Among the people that I know well, I am now comfortable talking to them. I ask people to correct my English if I am wrong. I don’t see it as an issue anymore. However, for new people and some people I know from before and I think that they may judge me, I do have the fear of not being able to convey my message properly.”

“Once, a peer told me that they so much appreciate international students because they work very hard and they can imagine how hard writing would be for them if they had to write in a different language. I believe knowing about that significantly helped me with my self-confidence. Also, my advisor has always been open about acknowledging my struggles and has normalized it for me that I can make a mistake and it’s fine. Acknowledging my hard work has allowed me to be open up about my struggles and not be ashamed of who I am as a scholar. I now practice harder, but also forgive myself for making mistakes and not turning in a perfect draft. I know writing a paragraph may take way longer for me than for many others, therefore, I let them know about this ahead of time. I’m not ashamed. English is not my first language and yet I was able to accomplish so much.”

As a recommendation to faculty members, being aware of the struggles that international students might encounter with respect to the language barrier and cultural differences would help students to gradually overcome such burdens. In fact, being non-communicative about this matter would gradually cause imposter syndrome in them, which can be the beginning of further irreparable issues such as mental health issues.

### *External Politics*

Some external and national policies have put an extra burden on international graduate students over time. In 2016 for instance, the travel ban proposed by the President of the United States put extra restrictions on travelers coming to the U.S. from six countries (Kahn & MacGarvie 2020). Although the number of countries affected by this ban was only six, over 10,500 graduate students were directly affected by the Ban (Matthews & Lord 2017).

Prior to the ban, students coming from these countries, compared to their peers from other countries, had to wait longer to get their visa issued; because of the delay, in many cases, students had no choice but to defer their admission. In addition, they have been given single entry visas meaning that they won't be able to return to their countries during their academic years, and if they decide to do so they have to re-apply for the visa again, which has the risk of not getting approved. In some rare cases, they are issued two-year multi-entry visas.

The travel ban not only took away the possibility of students to visit their countries and families, but also closed the door to their families to apply for a visa and to visit their loved ones in the U.S. This led to students not being able to see their loved ones on important occasions of their lives as well. There have been instances that students decided to get married while in school, or their baby got born, however, they were not able to share those moments with their loved ones. In instances that a loved one passed away, they were not able to attend the funeral. These instances have been shown to have direct effects on students' mental health (Hyun et al. 2007). Below, we share some of the quotes from the authors and/or students that reflect their personal stories.

“I was terrified by M’s situation - one graduate student who had their parents visit them a year ago, and one of the parents passed away while in the U.S. For the student to send the dead body of his parent to their country, and since the student was close to graduation and he did not want to take the risk of not being able to return to the U.S., they had to keep the dead body in the morgue for several months until the student was finished with his studies. I could picture that happening to me. I could not work for a few days, just because I could not stop thinking about M and what he is going through. It should be easier for us. That’s not fair..”

“Getting married without having my parents was a major concern for me. When you miss lots of events, weddings, the funerals of your beloved ones. All these affect your concentration, focus, and feelings. Seeing the tears of mom and dad behind the phone conversation, it would make me think twice about the fact that if it really was worth it to immigrate.”

“It did affect my personal life as I was very worried about my friends. It was distracting for me for a long time. But it made me feel the need to tell people about my country and culture and the good things about us! It felt so good when I started realizing that my advisor is cautious about what’s happening in my country. She would email me and simply say,

‘I’m sorry that you may be going through a lot. Let me know if you need anything,’ and several other instances. I think having a caring advisor was very helpful.”

While we understand that advisors and university administrations do not play a major role in those policies, they can always be students’ advocates. From our own experiences and stories we heard, we found the following helpful: (1) acknowledging that they care about the students, (2) providing them space to grief and process the events they lost at the cost of their education, (3) listen to their stories and reach out to university admins and be an advocate for them, or (4) even sign national petitions related to their students’ issues.

### **Navigation Adviser-Advisee Relationship as an International Student**

In the R1 universities in the U.S, tenure track faculty may encounter so much pressure. If they bring money to the school, publish papers, collaborate with other universities, etc., they are cleared, otherwise, they may lose their job. Usually, to bring money to the school, advisers need to write proposals, and to win those proposals, most of the time they should claim that they are going to come up with an extraordinary solution to a problem. Through these grants, they usually support graduate students to help them find the solution to those extraordinary problems and get the research done. Thus, the graduate students would also encounter pressure on their part. Moreover, they are generally getting paid way less than many professionals in the industry, but they are expected to work way harder: probably about 20% of their advisers (if an assistant professor), 15% (if an associate professor), and 10% (if a full professor).

“In my view, R1 universities in the U.S. are “big private companies” with multiple subsections called “Departments.” Inside each of those departments, there are several dozen research & development (R&D) facilities called “Research Groups”. Advisers are employees of universities and at the same time, they are the director of the R&D section. Graduate students are the employees of the R&D facilities working for those advisers. Universities put pressure on their faculty members through a bottleneck called “tenure track.” If they bring money to the school, publish papers, collaborate with other universities, etc., they are cleared, and the graduate students are the pawns in this chess game. To bring money to the school, advisers need to write proposals. To win the proposals, most of the time they should claim that they are going to come up with an extraordinary solution to a problem. That’s the graduate student that has to find that solution. Despite having a crucial role in progressing the mission and vision of the R&D facilities and the universities, in general, graduate students are known as “Cheap Labors.”

Graduate students are in a vulnerable position in academia. They usually do not have the power to make decisions on their own, and therefore, they will be at a disadvantage in many situations. International students are even more vulnerable. Many of them live academic life with a lot of concerns. Among the stories we heard, some of the concerns were regarding navigating the advisor-advisee relationship. One main pattern that we noticed was that students were always afraid of their funding being terminated. An F-1 student is only eligible to stay in the U.S. if he/she continues to be a student. If their research assistant or teaching assistant is terminated by their adviser, they have the following choices:

- Switch an adviser or apply to a new university

“This [switch an advisor] was an extremely stressful process since I was told that not many advisers would risk working with a graduate student that wants to switch labs.”

“This [apply to a new university] was not even an option for me. I had to contact the faculty members at the destination university, and they would ask for my advisor's recommendation letter. Also, it costs money: paying the application fee to the destination university, submitting my TOEFL/IELTS/GRE grades, sending my official transcripts, etc.”

- Pay for the school, which is extremely expensive for an international student - and the chances of getting a loan from the U.S. banks is almost zero because they need at least a U.S. citizen as a co-signer.

“Fear of losing my “job” which was entangled with my studies and more importantly with my VISA. It was extremely stressful.”

- Leave the country to your home country

“This was my nightmare. I could only imagine how disappointing that would be for my parents, let alone all the financial burden I caused them when I left the country.”

As a vulnerable F-1 student VISA holder - with a hope to get his Ph.D. after many years of education - of course, you will try your best to obey your current adviser, because at the end of the day, after more than five years of working towards your Ph.D. track, you will need his signature to graduate. You will need his recommendation letter if you want to become a faculty member in another university, you will need his support if you want to apply for U.S. permanent residency, and so on.

While many of us have had good experiences with our advisers, some did not enjoy their experiences. We recognize that these stories are only stories of individuals we talked to and we only know one side of the story. However, we, the authors, believe that sharing them provides insights on the habits that may cause frustration not only for international students but probably domestic students.

“I think my ex-advisor, in a previous institution, knew that the university administration, including the ombuds, would have his back in our adviser-advisee relationship. Several times he threatened me that he would cut my salary or I needed to quit working at his lab, humiliated me in front of other peers for a “silly” mistake, shouted because the results were not as “desired,” emailed me at 2:00 a.m. and expected a rapid output the day after. I felt like a slave in the system. I felt like I was mentally harassed, and I was being abused. All I could do was to master out. I was done. It took a lot of courage to leave that toxic environment. Surprisingly, the adviser got promoted based on the number of publications, amount of grants, number of projects with various agencies, but not based on how he treats his colleagues.”



All of this can make an international graduate student a vulnerable “slave” to the system. Other possible/experienced conflict of interests, obvious loopholes, and clear bed for any unethical behaviors - a crystal clear conflict of interest - are included but not limited to the followings: adviser asks his graduate student to do his personal tasks such as, transport him and/or his families to/from the airport, feed his dog while he is away, maintain his personal website and social media, add committee members to expand his own network, hold a handful of conferences, add his “favorite” student to a journal/conference paper without any tangible efforts, add his ex-student to a journal/conference paper after receiving money as a quid pro quo or “because he is paying for the registration fees.”

Although enrolling international students can be very beneficial culturally and economically to the U.S., if the overwhelming pressure on students is not fully addressed and resolved, it can result in irreparable damage to society in a long term. Therefore, we highly encourage university administrations to initiate graduate student unions as part of their policy change efforts. In industry, labor unions are powerful entities that prohibit unethical behaviors from employers, however, in academia, despite having a myriad loophole for abusing graduate students, we still do not see a reliable source of rules, regulations, and rights for graduate students in many universities.

A few more suggestions for this significantly important topic are as follows: (1) Students might benefit from improving the communication with their advisors and explain how they feel about the injustices and unfair acts. (2) Students might want to ask peers and groupmates if they feel the same way and make a community or a student union to act against such injustices. (3) Students might also want to adjust themselves to the “culture” by attending social events, workshops, and orientations to meet different students and start developing a big support network for themselves. (4) Students might seek help from the campus counseling centers whenever needed to discuss their issues. Moreover, counseling centers might want to perform mental and behavioral analysis on both graduate students and faculty members, before they get hired or promoted, to approve the mental health of these university employees. (5) Students might want to contact HR, university ombuds, or related organizations and ask for help. (6) University administrations could ask for the graduate students' ideas and suggestions, through anonymous surveys, about the overall behavior of their advisors and faculties, and have some representatives to follow up the possible exploitation instances. For example, departments might ask for graduate students and ex-graduate students to fill out “recommendation letters” for faculty members before they get promoted; although, the number of students who do master-out for no clear reason, or the number of years that students stay in a research group as PhD students and with few publications could be an indication of underlying issues. (7) Graduate programs could offer more protections against exploitation of students - who are at the bottom of this academic hierarchy - to nurture happier motivated students, who can work even harder, learn faster, feel respected.

## **CONCLUSION**

This paper aimed to collect and share unheard stories of anonymous international graduate engineering students who did not have a medium to advocate for themselves. We, the authors, have a shared identity with these students through nationality, religion, language, and culture, and decided to reflect on their stories and our personal experiences and share the struggles and barriers international engineering graduate students would face. The struggles were divided between two periods, before graduate school and during graduate school. We found that many of these barriers are out of students' control, which is mostly resulted from internal policies (university-level), and

external policies (national-level). These policies could result in extreme frustration for graduate students. The COVID-19 pandemic and immigration policies that were put in place made the situation even harder for international graduate students. On the other hand, there have been personal and cultural barriers that could also result in students' frustrations during their graduate studies. In addition to these struggles, students felt that not being supported by their advisors, supervisors, and PIs has been extremely stressful and challenging for these graduate students.

As we shared the stories of many graduate students, we aimed to advocate for them and call for allies. Graduate school can be very challenging and an emotional rollercoaster for many students. However, when it comes to international students it is even more challenging since even the policies that are designed to protect higher education can cause additional stress and frustration for these students. As we wrap up this report, we ask the Engineering Education community to understand the challenges these students are facing, acknowledge their hard work, and provide resources for them to support them both emotionally and personally. The engineering education community should be proactive in creating the infrastructure for international students to ensure their success. The infrastructure can be as simple as developing student committees to help new international students better navigate students. We believe that if other engineering graduate students, mentors, and advisors provide a safe and welcoming space for the international students, they can feel secure to share their stories with more courage and become self-advocate by talking about their struggles and challenges.

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