

Thank you President Flores, Members of the Board of Trustees, Faculty, staff, students, and parents.

It is my honor to be speaking here today.

I learned about your school before I arrived in South Carolina, on January 1. The philosophy of the school, its facilities, and its people (all of you!) are simply brilliant. With every passing day, I learn that South Carolina holds even more hidden gems than I thought it did when we decided to leave Charlottesville after 28 wonderful years, to move to USC.

So, what attracted me to USC? Everyone (including me) thought I was going to be a lifer at UVA. Then, I hired a faculty member from USC, and he was wonderful! Every once in a while, when I lamented the inefficiencies of some process, he would tell me about how USC did things right. Prior to that, my only knowledge of USC was when in my first year at UVA, my department chair asked me to take a student organization to Virginia Military Institute, for a regional meeting. I really did not want to go, because I did not know anybody in the schools in the mid-Atlantic or the southeast. So as I was trying to find out a way to get out of the assignment (I am sure you *never* do that!), I happened to look at the list of schools, and noticed that USC was going to be there! Some of my friends from MIT had gone to USC; so I could see them at VMI! Of course I was somewhat puzzled why in the world would Southern California be coming to this regional meeting! But as with anybody who has used a windows PC, I have learned not to question strange things: just hold CTRL-ALT-DELETE, unplug and re-plug, and do 3 jumping jacks, and voila! Back up and running.... So, as you can imagine, I did not feel terribly smart when we got to VMI, and as we were registering, I saw the table with the banner that said "University of South Carolina!" Yes, that was my first interaction with the University of South Carolina. I still get a chuckle every once in a while when I am walking to the administration building on the historic horseshoe: it is rather ironic to have gone from the "wrong" USC, to being her dean of engineering and computing!

OK, I digressed: so, through that star faculty member that I hired away from USC (and am now very sorry to have done so!), I learned about the school and its leadership. At UVA we faced some leadership issues a few years ago that made national headlines in academic circles. Soon after that there was a call from a search firm, asking if I had an interest in the deanship at USC. My standard answer to such inquiries was a polite no. I was not looking to leave. But for USC, I said yes. We love South Carolina, and vacationed here often. So we decided to look into it. Everything lined up, and it has been great!

Surely there are challenges, but I believe the landscape of engineering and computing in South Carolina is unparalleled. SC has become a hub of manufacturing. There are two major engineering universities. And a few more computer science programs. The technical colleges have superb facilities, as do many of the schools. Chief among them, this one!

The state has been quite proactive and strategic in its approach. She identified clusters in which to become excellent: such as automotive, aerospace, energy, and advanced manufacturing. And she put in place the machinery to address the workforce needs of the

companies that were being attracted to the state. So far it has gone well. **Now**, we are at the beginning of the next phase, where we engage with the companies in their research and development activities, and help them solve not only today's problems, but also design their solutions of the future.

So the state has done well to have a plan. The rapidity of the transition from a tobacco-based and tourism based economy to one based on manufacturing and tourism is truly remarkable. A clear vision and a plan were needed. **You** need those too! But how does one plan? And what **is** a plan? Let me share with you mine.

In 1978, when I was 16, I flew from Iran to the US with my dad. I was going to 11th grade at the Hun School of Princeton, in New Jersey. So, 38 years ago, almost to the day, I was **exactly** where you are: leaving home for the first time, going to a boarding school to start my junior year, and being on top of the world! I was going to get my civil engineering degree, go back to Iran, and become rich! That was the plan, and it was far better than that of the gnomes in South park: they had a three-slide powerpoint presentation: 1- steal underwear, 2- a giant question mark, 3- get rich! That is not exactly a plan! I had a good plan: my relatives ran very successful engineering firms, and with a US college degree, I could write my own ticket!

But the plans started to unravel from minute 1! We landed in JFK, late at night, and took a cab to Princeton. I had spent time in Europe, but not in the US, so my concept of the US was from the 1960's and 1970's TV shows which were invariably based in affluent neighborhoods of Los Angeles: Rockford Files, Colombo, McMillan and Wife, etc. So as the cab pulls onto the turnpike in northern New Jersey (of 1978 no less!!), that is not exactly Los Angeles!! I told my dad: how about we just go back? He told me to wait and see Princeton, because it is nice. And he was right. Princeton in 1978 was a beautiful piece of heaven on earth. A beautiful American town straight from Saturday Evening Post (Google it!), with a little square, with a couple of gentlemen's clothing stores; the kind that does not exist anymore: an old man, with a tape measure around his neck, putting a jacket on you, putting some soap marks on there, then ripping the sleeves and shoulders up, and destroying the garment, re-assembling it with some pins held between his teeth, and telling you to come back in an hour. And lo and behold, an hour later, you have a perfect-fitting jacket!

After I was properly outfitted with jackets and ties, etc., I started my orientation, and the 2-a-day cross-country practices in the humid heat of Princeton. I can still smell that air and feel that heat. When you are young, you just go.... Then one day, as I was walking to class, my dad stopped by, gave me a hug, and said that he was flying back. That was not a good day. And then two days later there was military curfew in Iran, and the revolution started. There was no contact with Iran and with my family. So the plans changed: whereas the plan was to go to Iran and get rich, now I had to make sure that I had a new plan for staying in the US, and the plan had to account for me being on my own going forward. Academics had always come easy, just as it comes easy to you. Straight A's throughout. You will know full well the dilemma, because you are in the same boat: how do you pick what you want to study and be good at? That is not an easy call when (not to be arrogant, but stating facts)

you can pretty much excel in everything you decide to do. I am sure you either have worried, or will worry, about what you want to do. And I full well understand your trepidations. It is like buying soap at Target: just give me **one!** I don't want to have to choose from **nineteen** aisles of soaps!!! You need to find your own soap too. But where I am going, is "don't get bogged down searching for the perfect soap", what matters is cleanliness! So along the way you may decide that you actually want hair products instead.... The end-all-be-all is not the actual discipline that you study; trust me! What matters is learning how to formulate relevant questions, and then how to find the answers. And by far, it is more important to formulate the "why" question. **That** is research. So, have the tenacity to pursue the "why" questions. It requires a lot of hard work; you need to have both breadth and depth.

View homework as a vehicle to learn, not as busy work. Remember, **all** the old **named** formulas and theorems, are named after people who were alive at some point. They had families, they had bills, they interacted with peers, there were politics, etc. You need to study the history of science and philosophy of science. Without that, your learning is incomplete and is missing the important element of context. Why did Newton invent calculus? Why did he and Lagrange and others develop dynamics? Money was involved: shipping! How do you keep track of your longitude? Dynamics was a way of formalizing Kepler and Brahe's massive datasets, and providing a way to make star charts more useful. In the meantime Harrison, a mere craftsman, shows up with a clock that keeps perfect time in marine environments, and solves the problem in a **completely** different way (think data-science revolution today)!

Now, back to us: so, I had a plan to continue with civil engineering, and get rich, but to do so in the US now. And I was going to Caltech. But then my friends started to leave for college in August, and Caltech would not start till late September (Quarter system). I would have been bored. So I mailed MIT, and they said come on over. I showed up with about 2 years worth of credits, like you will. But they were mixed up, so I had to take a lot of my courses in other departments, which turned out to be invaluable. And I was "forced" to take humanities. I hated that someone else was dictating what I had to take; after all, I knew all the answers! Well, apparently I did not! I fell in love with philosophy and philosophy of science. And soon I realized that I did not like civil: you design things not to shake or move, which takes all the fun out of everything! I like dynamics and motion (search for "UVA manta" on youtube!). Fortunately I had taken some graduate math course with a young assistant professor in math, and he offered me a graduate position with him in mechanical engineering. In the meantime, my philosophy professor had a colleague at Princeton who wanted me to go and work with him. That was a tough decision. I am on a student visa, in the aftermath of the hostage crisis; going back to Iran is basically out of the picture, and I have three choices: philosophy, which I love, but is risky, because if I am not the absolute best and don't land a faculty position, I am toast (wrong actually, but at the time that was my thinking); or study math which I love, but same as above, or, study mechanical engineering, but really do math, yet be labeled an engineer so I am marketable in case I do not want to go to academia. In the end, I went with option 3: doing math as a mechanical engineer. I still question that. And as a faculty advisor, over the past 30 years, I have probably sent 3-4 students (without visa issues!) away from engineering to math or

philosophy, because that is where their hearts were. And frankly, now that I know more, I know that you can do anything from any field. So do what you love. Trust me on that. It is all about the education, not the training. You can pick up the training on your own.

Soon into my graduate career it was apparent that I am staying in academia. As I was interviewing with math departments, I gave a talk at a conference. It was a complex problem I had solved. After the 10-minute talk, there was an elderly gentleman in the front row that started asking very hard and detailed questions, and I got into a bit of an argument with him; and I prevailed. As the questioning dragged on, the session chair said “Ali, we will need to stop this now”. At that moment my heart sank to my feet: it was Ali Nayfeh, the guy who literally wrote the book on *all* the methods that I had used! Had I known that ahead of time, I would have not been able to answer the questions, and would have instead gotten sick in front of the room! So, there can be great value to ignorance!

After that talk, because of my supposedly “confident” performance, I was invited to interview at the engineering school at UVA. But, when you are from another country and you land in the northeast, your view of the US is Boston, NY, Aspen, SF, and LA. The rest of the US is merely a landmass. And I was **not** going to Virginia!!! But they were persistent and reached out to my advisor’s advisor, who was also at MIT. He stopped me in the corridor and said, “Hossein, UVA is not MIT, but it is a great school and you should go for the interview”. Best advice I got. So, the moral there is “don’t be arrogant”, and don’t look down your nose on an opportunity. Give everything its due attention. So, I went to UVA, got a joint appointment in engineering and applied math, and had a wonderful 28 years.

Still, there were some things that I did not like about the place. But instead of complaining, you volunteer to chair a committee to address the shortcomings. And when you volunteer, don’t ask for someone to give you a charge! Develop your own charge. This way you can take any committee, and turn it into a very important one in the department or university. And keep on fixing things. And be impatient. Do not over-study something. Just go with a good solution.

So, how **does** one come up with a good solution? Here are the best two pieces of advice I got from a mentor: listen to everyone. Don’t waste anyone’s time. The former means you have to overcome your implicit biases. You will be surprised. I sure have been surprised over and over in my career. Some of the best solutions came from listening to those that I might have thought had little to offer. And when you get a committee together to invest time and develop a credible plan to address a rather controversial issue, then you **MUST** implement their solution; otherwise you will have wasted their time.

In hindsight, none of my detailed plans seem to have materialized! Yours will be the same too. Life is a series of good accidents. You just need to be ready to grab them, and have the right tools. Being smart is necessary. But you also need to be able to communicate well, and articulate and advocate. Don’t give up easily, but don’t be unbendable. As Bill Maher said at a recent show “there is no shame in punting”. Especially in research where you are trying to come up with the “why” questions. Sometimes, the path does not lead to a solution. You will need to change tack and try something else.

You are amazing students. And you are at a superb school. So let's do a little bit of logic: "if at GSSM, then very bright". The truth-value of this conditional is equivalent to "if not very bright, then not at GSSM". Obvious... But what this is *not* equivalent to, is "if not at GSSM, then not very bright". Being at GSSM is not a sufficient condition for brightness. To arrive at the take-home message, let's beat this dead horse some more: what does bright mean? It is a quality. But we often are interested in ranking people in order of their brightness, to fill up available seats at a competitive school such as GSSM, or USC, Clemson, etc. So, in late 19th century, as there was a need for educating work force in order to help energize the industrial revolution, we came up with the compartmentalized and assembly-line model of education, where we have 12 grades, and courses, and tests, etc., and democratized the inefficient (was it?) tutor-based model which was not available to the masses. But this is only *one* of the ways to learn. It serves people who are wired like those of us here today. Book learning comes easy to us. But there are many studies that show that people learn differently. And some, who may be slow at the beginning (because they need to UNDERSTAND *WHY* they need to learn something), once they get going, then they learn at a very rapid rate, and end up at the same place as the rest of the group. So most of those people are not in this school today, but they are out there. Some other people that are not in this school are those who have more complicated life parameters than you or I have had. Not everyone is dealt the same hand of cards. While you have every right to be confident in your own abilities, because they truly *are* impressive, I implore you to not lose sight of the fact that just because someone did not attend GSSM in SC, then they are not as good as you. Confidence is great. Hubris is not.

And make sure that along the way you help everyone that you can help. When I was getting ready to leave my postdoc and start at UVA, I asked my advisor for one parting piece of advice. He said, "Do Good Work". That is actually a very complicated piece of advice. Took me a few years to figure it out for myself. So, I pass it on to you to come up with your own interpretation of it. Do good work! Get a great education; and regardless of where you go (hopefully to USC Honors college to study engineering and computing!), I hope some of you will come back to South Carolina, and then *some* of some of you will join the faculty of our fine state universities and carry the torch. I would love to see a handful of you on our faculty! See me after the talk to sign on the dotted line... or email me at hhh@sc.edu

Finally, I want to thank you and the School for inviting me to be your speaker. The preparation process turned out to be a wonderful and bitter sweet trip down memory lane. As a result, I have re-established contact with several of the then-younger Hun School teachers who are still thankfully around. And have been blessed by their kind memories of our time nearly 40 years ago. Hun was an idyllic place. Several times when I had meetings or seminars at Princeton, I walked to the school and strolled the beautiful grounds. But the feelings of physically being present at the school *pale* in comparison with the feelings that have been elicited the last couple of weeks as I have established contact with my teachers and friends. Remember, it is *always* about the people. Build strong and lasting friendships, and do your part to keep them going. Do not take any friendship for granted.

Have a wonderful two years, and I wish you continued success in your careers.