From Angus Rockett, more comments concerning this morning's questions:

What factors contribute to the URM gap? Is there something universities can change to improve that?

A: nearly all institutions have active diversity, inclusion, and access programs actively promoting diversity. The main thing that can be done on campuses is to be more aware of climate issues and to improve them, reducing micro-aggressions (and outright discrimination).

My opinion is that the problem is with the message that URM's grow up with in our society suggesting that STEM is not something they can do. We need to reach down into URM communities and help convey a welcoming attitude that they can indeed do STEM. This requires society as a whole to change it's behavior. Institutions cannot address this one their own.

All universities are now doing online learning. How might this radically change the competitive landscape in university education (so only a few dominate)?

The general response I have heard is that there is still plenty of room at the table for this. However, at some point higher quality classes in terms of student experience may begin to dominate if they can handle the total enrollments. It seems likely that online classes cannot scale up much more easily than face-to-face classes without loss of quality. Some institutions have unique capabilities in specific subject areas. That may provide ways of engaging an online audience. However, the problem with that is that a more specialized application/field also has a smaller audience that may not be economically viable.

Do you have any insight on the number of students considering graduate school in 2021 - both domestic and foreign nationals?

The number of domestic students is probably at least stable balancing losses due to students being discouraged or underprepared and gains due to students worried about job prospects and applying to graduate schools. Almost certainly the number of international student applicants is down because of the increasing quality and availability of study in other countries, increasing marketing of those programs, and a generally hostile attitude to foreigners that the media presents currently. Foreign students who have applied and been accepted have additional problems getting visas and (as a result of COVID) traveling to the US.

Can we determine impact of the disruptions from Covid 19, on the expected MSE/Manufacturing graduation rate for the class of 2021, and beyond?

There is no evidence I am aware of that there will be disruptions from COVID on graduation rates. So far I am not aware of large numbers of students taking gap years or delaying graduation. With that said, enrollments are down about 10% in many programs so it would be reasonable to expect a 10% lower graduation rate in three to four years.

What might we learn from other countries that have been facing workforce shortages in different areas, often due to demographic shifts, such as Japan and EU?

Japan and the EU have been encouraging foreigners to join their programs. (This has been difficult for Japan due to their cultural preference for isolation but they have been learning to accept it nonetheless.) The US has benefitted from the best and the brightest from other countries both studying here and staying after their studies. The loss of that community is a potentially huge loss to the US in my opinion.

Do you think leveraging digital technology like data science, robotic automation, etc. might be able to offset workforce shortages to maintain productivity?

Maybe. In selected areas perhaps. One of the things that immigration has provided is a constant influx of highly trained and skilled individuals who maintain and enhance productivity. In the current environment we bring in technology in selected cases where we are short of people to do the work. Technology is certainly speeding some things up (think computational materials design) but the problems it can solve are limited. Technology is more likely to improve productivity than to create new technologies or solve problems on its own.

What are examples of local political views that influenced academic policies or practices on-campus?

As in society as a whole there can be resistance to following guidance such as mask wearing, social isolation, etc. The biggest problem on campus is usually students engaging in social activities without careful adherence to social distancing. This may be apolitical as young people both tend to view themselves as immortal and to be looking for communities and relationships they can join in.

Could you gather feedback from other ed institutions? i.e. community colleges, defense ed institutions (air force's AFIT, defense acquisition univ DAU, etc)

We hear some about the experiences at these institutions. The bigger differences seem to relate to the resources of the institution. Very large universities (e.g. big 10 schools) have problems but they have a very broad spectrum of ways that they can respond and resources they can draw on. Small schools, especially small private institutions with limited financial resources, face much larger problems. These smaller schools have, in some cases, had to eliminate whole departments and to fire faculty. Usually this is not in STEM disciplines. Community Colleges vary greatly depending on their state and local support.

It seems many of the US academic institutes are lowering their standards to attract/retain more students. Do you think that has a role in putting the US behind?

I know of no evidence of schools lowering their standards. However, as with the previous question, schools that are small and not exceptionally prestigious are where the problems occur first. It seems likely that we will lose a significant number of these institutions.

How does the change in graduate student enrollment affect undergraduate education?

This depends on how extensively an individual program relies on graduate students as TA's. My sense is that the answer is "not much". There seem to be workarounds. Since I have not asked others, that is just my impression.

Do we have any data on recently graduated foreign students (Undergrad & Grad) stuck here in the US due to COVID19?

There are current students both stuck in the US with limited opportunities to go home and (more commonly) international students who cannot get into the U.S. to pursue their studies. There are few students who have graduated who are stuck in the U.S. I have heard the U.S. described as the hardest country to get into and the easiest country to get out of. At least the latter seems to be true.

The popularity of computer science was mentioned. Should we modify traditional materials curricula to inject more computing/data science to increase interest?

This is difficult for two reasons. (1) The availability of reasonably usable codes related to materials topics, and (2) the difficulty of interesting students in designing codes. It is easy to get students interested in designing computer games but hard to get students interested in developing materials modeling codes. Some institutions have students and faculty with enough interest in basic science to want to do the math and fundamental science to create materials simulations. However, probably the average institution focuses more on training students for jobs with companies and for very applied efforts. Developing numerical models of materials requires a highly intense effort. Real materials modeling typically requires a multiscale, multiplatform approach. To do this requires single-minded devotion to the effort, similar to being a top level electron microscopist. This means that there are relatively few people interested in the work. Furthermore, modern materials simulation requires a large high performance computing cluster. While these are available to researchers anywhere they are not easy to get enough time on. The top research groups have their own clusters.