

## **UC Merced**

### **AIARU: Panel 1 - Undergraduate Education and the Research University**

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**Academic Innovation and the American Research University  
Symposium**

University of California, Merced  
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**Panel #1: Undergraduate Education and the Research University**

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**UC MERCED  
FORMER ACTING  
CHANCELLOR,  
RODERIC PARK,  
PH.D.**

Next we hear from Michael Colvin, Professor of the School of Natural Sciences. Mike?

**UC MERCED  
PROFESSOR OF  
BIOLOGY,  
MICHAEL COLVIN,  
PH.D**

Well, I'd like to offer yet another perspective on the role of undergraduates at research universities. I spent the first 17 years of my career in federal research labs where we didn't see many undergraduate students except for the occasional students in summer research projects. So I've seen research environments both with and without undergraduates and the associated teaching and advising obligations that come with them.

Of course research institutions without undergraduate teaching missions are different in many ways. We have different funding models, we have different ways of spending our time. And I believe those obvious differences, the lack of a large student body affects the experiences of researchers in ways that are less obvious but really

still very profound. And those are the differences I'm going to comment on in my time here. Based on my experience at UC Merced for the past six years, I've noted about five ways in which the research environment would be different if the undergraduates were to suddenly disappear. Okay. And here those are.

First, the students provide a real clock or rhythm to a research institution. That includes both the rapid cadence of the semester and the slower progression of students from freshmen in our big lecture courses on to being seniors in our seminars or even in our research labs. And I think this constant reminder of the passage of time acts as a *memento mori* [Latin phrase translated as "Remember your mortality"]; that time is short and opportunities are fleeting. In fact, I think that one of the reasons that academic researchers are so very productive is that we always see the sand in the hourglass and so we know that we have to, you know, stay on late in the lab working or get that paper finished today.

Second, I find that the students provide a reality check on our research in many ways. Just the struggle to find compelling ways to explain the complex ideas or our detailed research to students whose attention is, of course, divided by the, you know, in many, many different ways by social events and new technologies and so on. The struggle to find this, a good way of explaining and justifying our research forces us to constantly reconsider, you know, really, the value of our research. You know, if we can't convince a class full of students that it's interesting, you know, is there really something there?

Further, the need to revisit for a class the fundamental tools and assumption of our field of research makes us constantly review the foundations, our foundational assumptions, right, so that we're constantly going back and asking, "Is

this really a good basis for building this whole intellectual structure?" Third, the undergraduate students, at least in my experience, often bring in the seeds of new ideas and approaches to problems for the very reason that they don't know the accepted facts or techniques in the field. By asking so-called uninformed questions in a class or in a summer research project, they sometimes can point out directions to better approaches. In some cases they can bring in very specific new techniques. For example, in my field, which is computer simulations, students frequently bring in the tools of, the software tools or the programming languages that they've learned on their own or in other classes and that they prefer to use instead of whatever is the standard in the field. And often these have ended up to be better substitutes for the long-established tools in the field.

Fourth, the students help keep us focused on the long view and bring to the foreground our obligations to the next generation to leave them communities and universities and a world that are both vibrant and sustainable.

It's, it's amazing to keep in mind that most of our current students will still be in the workforce in the year 2050, right, which is the sort of point on a lot of these graphs when a lot of dramatic things happen. Well, this is very distant for us but very immediate for them. And if these students take good care of themselves, many will live into the last decades of this century or maybe even into the 22nd century, right?

So these students will witness a world in where there may be as many as 10 billion people and these students will experience the full effects of things like global climate change.

One of the courses which I teach, which is biological modeling, I'm frequently describing predictive trends that will play out probably not in

my own lifetime, but definitely during the students' lifetime and that certainly gives me pause about the decisions we're making now.

And finally, the fifth point, is that our students, I think, help provide us with something that even the historian Herodotus would well understand. And this is some possibility that our personal thoughts and ideals will not be totally effaced by the passage of time. The reality is that the pace of modern research is so fast that most of our papers and books will either be built upon by other researchers or simply forgotten, right, in the very near future, right? But the students for which our enthusiasm for the field provides in the first start, spark that it would be interesting to study genetics or philosophy or astronomy or the brain, will carry our own personal memory to the end of the century and maybe even further through the students they influence.

So, so those are my thoughts on the impact of undergraduates on the research institution. Thanks very much. [*applause*]