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Office of the Chancellor

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Panel #1:Undergraduate Education and the Research University

Prith Banerjee, Ph.D.
Senior Vice President, Research, and Director, HP Laboratories

UC Merced Former Acting Chancellor, Roderic Park, Ph.D.

Let me just introduce to all of you, Prith Banerjee who is the Senior Vice President of Research and Director for Hewlett-Packard Laboratories. I should add that it's very difficult for faculty members to speak in any quantum units of less than 40 minutes. [*laughter*] And here we have, we have eight people speaking in an hour so I'll just remind people of time brevity and our enforcer is Shawn [Kantor].

Senior Vice President of Research and Director, Hewlett-Packard Laboratories, Prith Banerjee, Ph.D.

Thank you, and I want to thank [UC Merced] Chancellor [Steve] Kang for inviting me here today. I really feel like a fish out of water among all the academics and the chancellors and faculty and so on. I am perhaps the only one from, representing industry. But I will tell you that my background was in academia. Until two years ago, I was embroiled in the same conversations and conflicts that you are all part of.

After graduating from the University of Illinois at Urbana-Champaign, I actually was on the faculty of UIUC for a dozen years and where actually I was a colleague of Steve [Kang], and then subsequently went to Northwestern University, and finally I served two years as Dean of Engineering at the University of Illinois at Chicago.

So why am I saying this? Not to talk about my resu--my background but to say that I have had the fortune of seeing public universities, large, strong public universities, private universities, the sort of the non-sectarian kind, and being in a smaller public university under the shadow of big brother, UIUC.

The last three years I have spent at Hewlett-Packard in research, heading up the corporate research arm of HP. And I want to first talk about a transformation story that we launched at HP Labs and then I'll try to relate it back to, back to the challenges that face you.

The key take-away point that I want to share with you is that top-down dictates do not work. You need to empower the people, in this case the faculty, staff, and students, to do the right things. It is the role of management to set down the proper incentives to drive the best behavior.

So rather than saying, "You shall have a department of bioelectrical computing engineering," provide the right incentives in terms of resources and so on, in a transparent manner, fair manner, and the right--people are smart. They will figure it out. And they will do the right things. So that is the key take-away point and let me tell you the challenges that we are facing HP Labs and where we are today.

HP Labs is the corporate research arm for Hewlett Packard. Hewlett Packard is a very, very big company, 100 plus billion dollars in revenue,

300,000 employees, invests about three billion dollars in R and D every year. There are 30,000 very smart R and D engineers that work for HP. HP Labs is a tiny, tiny part of the organization. Whereas the 30,000 R and D engineers for HP, they work on the next generation printer, the next generation laptop, next generation server and software, the role of HP Labs is to look beyond the road map and create opportunities for HP, five, ten, fifteen years from now.

And HP Labs, like other corporate research labs, were created 50, 60 years ago. Now if you look at the role of the corporate research lab, and you say, we are going to do basic fundamental signs like we just talked about in terms of the publications and highly cited stuff and so on, if you do that 100% of the time, in the times of the lab that were fantastic 20 years ago, when you had a monopoly and we had, you could do that. In today's economic conditions, if you did 100% of your time basic science, with no relevance to the organization, to the mother ship, you will not survive.

On the other hand, many corporate labs have figured out, "Oh, we want to be relevant. And we want to be relevant, we will do research that is tied the current products and services." And if you are 100% aligned with your products, then again, the question gets asked, "In HP Labs you're only five or six hundred engineers, researchers. We have 30,000 people at HP working on next quarter's products. Why are you doing this? Let's shut down HP Labs."

So essentially the point is that if you do 100% basic research, shut down HP Labs. If you do 100% percent product research, shut down HP Labs. So, three years ago, we, we, we took an approach, where it's a portfolio approach. A third of our research is basic long-term, five, ten, fifteen years into the future. A third of our research is product-related, and a third is applied.

The second thing we did is we wanted, HP Labs, the researchers were involved in the silos--the picture that Steve just mentioned. Five, six hundred researchers working on 200 research projects on their own little thing. Two researchers working together on a cash currents algorithm for processors wrote up a paper, fantastic individual outcome, did not impact the company.

And here was our CEO marker looking for Prith, where is my new iPhone? So the organization needs high impact. But they're not looking for the next, next quarter's laptop. That's not what he's looking for. He's looking for some really, really big things that's going to change the world. And you cannot do that with just one or two researchers working because you don't have the right resources. So the thing that we did at HP Labs was we are going to focus on high-impact research. Prith does not know that domain. I, I did not know what we should do. But we set up the policies for researchers to propose really high-impact research topics. And I said for an organization like HP Labs, should have about 20 to 30 high-impact projects, interdisciplinary, bringing people from multiple disciplines and we're going to fund those.

So we have labs just like departments and universities, right? Except the projects are interdisciplinary and always that is, we will have in this organization, about 20 high-impact teams. It took us a long time to get to that point, but today, HP Labs is involved with 21 big bad topics across eight teams. The teams are content transformation. Information management. Immersive interaction. None of those look like computer science. Electrical engineering. Mechanical engineering. The point is that interdisciplinary high-impact research going on in an organization.

The incentives were that we will provide the resources for the research in this high-impact areas. If people choose to do their silo stuff, they

could still do it. They will just not get significant resources; the resources are directed for larger efforts.

Guess what? People figured this out and they are collaborating, working together on the twin goals of really pushing and I said in HP Labs you need to advance the state of the art in whatever you do in a significant, significant manner.

I am not interested in us doing, since Google and IBM have this solution, we don't have it, let's do it at HP Labs. No. We said in HP Labs, we are the corporate research arm, we absolutely have to do fantastic research that advances state-of-the-art. So that was goal number one.

The other goal is, whatever we do, we should have significant business impact to HP. And significant impact for a hundred billion dollar company is a billion dollars of revenue or more.

So this is how we set our goals. And I think we have, again, we have just gone through this transformation. The researchers are working on these interdisciplinary large-project teams.

For example, there is a project on a thing called a central nervous system for the earth. It's work that involves sensors, billions of sensors. So there is fundamental work going on in nanotechnology in terms of inertial sensors and so on; these are sensors that are 1,000 times more sensitive than what you have today. But taking a billion of these sensors, communicating through wireless so people are wirelessly working with our nanotechnology people, ultimately getting all this data using data mining, so you have now computer scientists and data speed people working on guess what? Trying to predict the future. I mean that's the kind of high-impact research that we are doing. And it is all to the incentives. No mandates. Prith did not tell them you should work on central nervous system.

be departments like X, Y, and Z, coming from Ideas came from, from within.

I hope that as part of this conversation the group can figure this out. I think if you say there should Chancellor Kang--I know he’s not doing that--that would be wrong thing. Give it to the faculty. They will figure it out. Put the right incentives in place. Thank you very much. [*applause*]