

Science Sessions Podcast: Joseph DeRisi

PNAS: I'm Brian Doctrow, and welcome again to Science Sessions.

The Chan Zuckerberg Biohub is a non-profit organization founded by Facebook CEO Mark Zuckerberg and his wife Priscilla Chan, a pediatrician and CEO of The Primary School in Palo Alto, CA. The Biohub is affiliated with three major universities in the San Francisco Bay Area: the University of California, Berkeley, the University of California, San Francisco, and Stanford University. Its goal is to facilitate collaboration between researchers at these institutions, to provide them access to the latest scientific technology, and to marshal resources toward solving major problems in biology and medicine. One of the two co-presidents of the Biohub is Joseph DeRisi, a genomics and infectious disease researcher from UCSF. I spoke with DeRisi about the Biohub at the World Conference of Science Journalists in October. He explained how the idea for the Biohub came about.

DeRisi: The original idea for the Biohub was really Mark and Priscilla's. I was actually at a conference with them at one point, and they actually asked, "why is it that the universities don't work well together? You know, we hear that folks at UCSF, or Stanford, or Berkeley don't actually see each other that often unless they're at some international meeting somewhere else." And that's somewhat true. And so that was the beginning of conversations that ultimately led to this idea of the Biohub.

PNAS: One of the Biohub's main components is an investigator program that funds 47 researchers at the affiliated universities. The investigators conduct research at their own universities, but also attend biweekly meetings at the Biohub in order to facilitate cross-institutional collaborations. Unlike NIH grants, Biohub grants are awarded based on the merits of the researcher, rather than those of a specific project.

DeRisi. We're basically taking bets on human capital—that if people have done amazing things in their past, they're likely to do amazing things in their future.

PNAS: In addition to funding researchers, the Biohub aims to provide its affiliated institutions with resources that might be difficult for the universities to acquire on their own: for example, in data science.

DeRisi: To be frank, the universities have a hard time hiring data scientists; the traditional university pay scales and compensation matrices are incompatible with what the market is actually demanding these days. No surprise, when you're competing with Pinterest and Netflix and Apple, and all those others.

PNAS: Additional platforms established by the Biohub include physical engineering, imaging, genomics, and genome engineering. On top of its work supporting research at the member universities, the Biohub also has internal research projects. One of these is the Cell Atlas.

DeRisi: The Cell Atlas aims to be able to identify and map all cell types in the human body in all states and transitions, including health and disease. One of the things that the Biohub does well is single-cell sequencing, and we think we can use a lot of single-cell sequencing technology and our data science group to be able to help define cell types. And of course, our advanced imaging group can hopefully then back-contribute to imaging those tissues and identifying unique cell types that weren't realized to be there to begin with.

PNAS: The Biohub's second research project is the Infectious Disease Initiative, for which DeRisi is a main advisor. One component of this initiative involves building on DeRisi's own research into using next-generation DNA sequencing to diagnose infections, some of which has already been applied in the clinic.

DeRisi: Here at UCSF, Charles Chiu and Steve Miller are actually doing next-gen sequencing for neurological infectious disease as a service, so a doctor can order that anywhere in the country. And we would like to see more of that happen, frankly.

PNAS: The Infectious Disease Initiative is also working on developing new drugs, vaccines, and immunotherapies for treating and preventing infectious disease. Additionally, they have formed a Rapid Response team that will work in concert with other aid organizations to combat disease outbreaks.

DeRisi: We're trying to see how we can help organizations, like the Gates Foundation, the London School, other organizations that do field work, epidemiology; to what extent can the Biohub's expertise in genomics and molecular biology assist in what could be a global emergency someday. We've got three powerhouse universities, with expertise in global health, clinical medicine, molecular biology, engineering, computer science, data science, and yet the true potential of all three of these universities have never been joined into one research endeavor before. The hope is that new and important things will come out of this that otherwise wouldn't have happened. That remains to be seen; we're only one year into this. But that will be one of the metrics of success by which we judge if this experiment has worked.

PNAS: DeRisi believes that private funding of science through institutions like the Biohub has an important role in furthering scientific research.

DeRisi: We exist in a time where public funding for fundamental basic science research and discovery is not keeping pace with where technology needs to go and our appetite for science. And therefore philanthropy, while it can never replace federal funding, it can help fill the gaps and do special initiatives and projects that the federal government just will never do, and I think this is an example of one. And I think if the idea and the structure and the way that we set it up and the way that we fund science is successful—and we'll see—it wouldn't be unreasonable that there would be more Biohubs elsewhere.

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