Will rapprochement mean new research collaborations between Cuba and the U.S.?

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On December 17, the White House announced significant changes to the relationship between Cuba and the United States. The announcement has garnered international news coverage, but one aspect of the announcement that has garnered little attention is what this may mean for fostering collaborations between U.S. research institutions and their Cuban counterparts.

To explore this issue, we talked to Dr. Ruben Carbonell, Frank Hawkins Kenan Distinguished Professor of Chemical Engineering at NC State, a member of the National Academy of Engineering, and director of both the Biomanufacturing Training and Education Center and the Kenan Institute for Engineering, Technology & Science. Carbonell was born in Cuba and moved to the United States in 1958. He and his wife both have family in Cuba and he is familiar with Cuba's research sector.

Do you think the Dec. 17 announcement from the White House will make it easier to establish partnerships between Cuban and U.S. research institutions?

Yes, definitely. For one, there will be an American embassy in Cuba that will make it much easier to organize trade visits, research exchanges, student visas, and many other activities that will help basic research and economic development in both countries.

From what I have read, the U.S. will no longer require special travel licenses for visits involving government business, most researchers and professionals, college faculty and students and anyone involved in educational activities. Visits by telecommunication providers were already covered by a general license to travel to Cuba, but now producers or providers of agricultural and medical products will also be free to travel with no special permits. Finally, foundations and institutes will be able to travel freely, as well as anyone involved in the dissemination of educational materials.

I anticipate that soon these activities will open up a floodgate of visitors in each direction that are interested in pursuing closer educational and research partnerships between Cuba and the U.S.

Of course, in the beginning, most of these will have to be funded by U.S. institutions since the economy of Cuba is in shambles. However, I can certainly foresee graduate students and postdocs and visiting researchers from Cuba being a frequent or constant presence in U.S. universities and ultimately being employed by U.S. industry and academia. Furthermore, the new U.S. rules will permit U.S. institutions to open bank accounts in Cuban banks and to use credit and debit cards, and this will greatly facilitate the execution of research projects.

Cuba has more than 20 universities, but some people think of Cuba as being behind the curve in science and technological development. Does Cuba have the expertise and resources necessary to be a significant research partner with the United States?

It is true that most Cuban universities are not up to the level of top tier research and educational institutions in the U.S., Europe and Asia. However, there are some areas in which Cuba has had tremendous success in technology development, and these all involve biotechnology, medicine and healthcare. It is in these fields that we are likely to see the most fruitful collaborations in the near future.

Is Cuba particularly strong in any specific fields? Any particular research areas where it is already in a position to make a meaningful contribution to an international research collaboration?

Carbonell: Cuba's strength in biotechnology is significant. This is a 30-year effort, mostly funded by the Cuban government, which has been extremely successful. There are strong research institutes such as the Center for Molecular Immunology, Center for Immunoassays, and the

Center for Genetic Engineering and Biotechnology that have had great success, not only developing, but also commercializing medicines for human health and other applications.

Over the last 30 years, Cuban biotechnology efforts have resulted in the production of over 30 vaccines for infectious diseases and over 30 oncology products that are either in the market or under investigation. In addition, there are over 20 products being developed for cardiovascular diseases and a dozen others for autoimmune and chronic diseases such as diabetes, multiple sclerosis and rheumatoid arthritis. Some of these Cuban technologies are being commercialized in Brazil, China and India and are being sold worldwide. There are over 1,800 international patent applications for Cuban technologies. There is no question that this is the major success of Cuban technology investments and it is also the most likely venue for future international collaborations.

In April of 2014, the American Association for the Advancement of Science and the Cuban Academy of Sciences signed a memorandum of understanding identifying four areas in the life sciences where they will seek collaborations and sustained cooperation: emerging infectious diseases, brain disorders, cancer and antimicrobial drug resistance. It is likely that the NIH, the NSF and other U.S. government agencies will begin to fund collaborative projects allowing Cuban scientific organizations to be one of the scientific partners.

As a sideline, it is interesting that the Cuban Academy of Sciences was the first academy of science in the Americas, being funded in 1861. The U.S. National Academy of Sciences was established by Abraham Lincoln in 1863. It is also interesting to note that even though the average salary of a Cuban citizen is only about $200/year, the infant mortality rate and average lifespan in Cuba is similar to that of the U.S.

Are there specific research areas where Cuba could

benefit from partnerships with U.S. research institutions?

When you travel in Cuba, there are many noticeable needs and differences from most of the rest of the world, but one of the more visible is the lack of a world-class telecommunications system. I think Cuba would definitely benefit from U.S. partnerships with research institutions in the areas of computer and communication technologies, large data analysis, computer modeling, displays, sensors, and pretty much all computer applications.

What could this rapprochement mean for research-driven economic development efforts, both in the U.S. and in Cuba?

Carbonell: Among the changes envisioned with the new rules, telecommunication providers, producers and distributors of agricultural and medical goods will be free to travel so this will greatly improve communication and interactions. In addition, there are several changes in the banking and trade regulations that will help economic development efforts in general. These include the ability of U.S. institutions to open up bank accounts in Cuban financial institutions, allowing exports including building materials, telecommunications and agricultural equipment. Also, the transfer of funds between Cuba and the U.S. will be simplified.

This is going to be great for the economy. It's like adding one extra Ohio to our customer base for businesses (11 million people) and there are a lot of hard working, smart people that we can rely on for a potential immigration base, many of whom would be students. I think it is really great news.