On ice with Eric Rignot

UC Irvine glaciologist looks back on four decades of NASA-funded research on Earth’s vulnerable polar ice sheets

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Eric Rignot, Distinguished Professor of Earth system science, is a world-renowned expert on the impact of climate change on Earth’s polar ice sheets. He is one of the most prolific recipients of NASA research funding at UC Irvine, and he expresses concerns that the cessation of that financial support will hurt humanity’s ability to remain resilient in a changing world.

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Maria Stenzel / UC Irvine

- UC Irvine glaciologist Eric Rignot has been one of the world's most prolific NASA-funded researchers.
- Potential NASA funding cuts threaten continued work to understand the dynamics behind ice sheet collapse in Greenland and Antarctica.

Eric Rignot, Distinguished Professor of Earth system science, is one of the world's leading authorities on climate impacts on our planet's polar regions. He became a research scientist at NASA's Jet Propulsion Laboratory in 1987, and he has been with UC Irvine since 2007.

In that time, he has led studies that have significantly improved our understanding of the dynamics driving ice sheet collapse. He has utilized an array of satellites launched by NASA and other international space agencies, and he has been involved in numerous expeditions to Greenland and Antarctica to conduct studies and make direct observations. He has also been a reliable source of information for reporters at the world's major news outlets when glaciers are in the spotlight, as they often are.

Following is a discussion with Rignot about his nearly four decades of experience as a NASA-funded glaciologist.

Brian Bell: You've been a NASA JPL research scientist for many years. Has this resulted in a stronger relationship between NASA and UC Irvine?

Eric Rignot: I grew up with NASA. They fund all my research, and in return, I've established some sort of relationship with them over time. I know what they want. They want added value on the missions; and I know what I want. I want to use the mission data and the funding to do science, Earth science. The core is to study what's happening in the polar regions with climate change. I don't want to sound arrogant, but humanity needs to understand what's happening in the polar regions, because it can affect all of us. So, it's been a fantastic road so far, working with NASA.

Bell: What are some of the key NASA-funded research projects in which you have been involved?

Rignot: Operation IceBridge, Oceans Melting Greenland, or OMG, and Measures are some of the most significant ones. Operation Ice Bridge was a very cool one. It

started in 2009 when President Obama put a lot of money into the federal system for the economy to recover from the economic crash. A lot of fresh money came to NASA, and they had the freedom to figure out what they wanted to do with it. And they wanted to bridge the gap between two missions, ISAT 1 and ISAT 2, using airborne platforms and collecting data of Greenland and Antarctica that we really needed and we couldn't get, especially at the pace we were operating before. IceBridge extended that for 10 years, and we got a fantastic collection of data in Greenland. We covered everything and more, and we also got an enormous amount of data in the Antarctic. It was a game-changer for polar research.

That period was funded at a high level. There were missions almost three times a year to the poles. It was fantastic. I was kind of worried about the team being completely burned out. Actually, I think they burned out. It was fantastic.

OMG caught up near the end of IceBridge to add the ocean component that we could not do with IceBridge while adding something on the fjords for Greenland. That was also a game changer. It was the first time we mapped fjords in Greenland and collected ocean temperature data. We have a reference set of observations that we didn't have before.

Bell: Has there been a project like OMG in Antarctica?

Rignot: I have tried over the years to spin up a similar effort for the Antarctic. I failed two or three times, but I'm not giving up. Last time at NASA, they said, "we made a mistake not to fund you." I said, "well, okay, thank you, but that doesn't help." They admitted that. So, we'll see. The thing is, Antarctica by airplane is whole 'nother level of effort compared to Greenland.

These projects work. If they feel like we are ready to go, if it's any question marks or things that are not super clear, it's going to be hard for you to get the approval. That's where we are. And the scale of Antarctica is so much greater than Greenland. It's seven times bigger than Greenland. There are no commercial airlines. The engagement of the team is much higher. And then there's this dilemma – do you want to do this like IceBridge, where we start from South America, go to Antarctica, and come back at the end of the day? Or do you want to do things with an airplane in Antarctica? And so that question is still a little bit in the air, but the scientific value of its mission is still very high.

Bell: What is the NASA Measures project you mentioned?

Rignot: The NASA Measures program uses all the NASA data and makes products for the scientific community. And the community uses that for ice sheet modeling, projection of sea level rise and all that stuff. It's an Earth system data record. No space agency had that before, NASA is the only one doing that. And that's really filling the gap between those missions and the users, because without that, the users need to become experts in this data to derive their own products. We derive it for them, at least for Antarctica. And another group was doing Greenland.

Bell: So, in a way, you're packaging the data into a format that people can understand better.

That must speed up their research quite a bit.

Rignot: Yes, and it makes the community grow, because you don't have to be an expert in SAR to use a velocity map. So, these are the major NASA-funded research projects. I forget exactly when NASA funded that, but they have a NASA sea level science team, which brings together people who are experts in sea level from different disciplines, from the physics and engineering aspects to the social aspect. We funded that at a good level to have these different disciplines start to talk together and sort of form a uniform view of what NASA sees in the theme of sea level rise. There's a team at NASA in charge of that. There's a slew of projects, but these are the major ones.

Bell: What's happening with you now? Do you have any NASA-funded research going on currently?

Rignot: We still have the NASA Measures program. But we heard rumors that the program will be terminated because of cuts in the budget of Earth sciences, which I think would be a pity. IceBridge is over. OMG is over. With the current budget situation, I'm sure NASA is not in a position right now to put a program together and post it out for calls, because they probably don't know what their budget is going to be tomorrow. So, it's a deep uncertainty. I feel like there's an axe hanging over the head of all these programs. I don't know which ones will be chopped and which ones will go through.

But whatever they do, it is going to harm Earth science, on observations and the ability of people to use Earth observation – not just the science, but the basic observations to inform us on what's going on our planet. Which we need to know like we need to know the weather. We need to know the climate system. So that's a very

negative thing.

There are some threats to the NISAR mission, which was launched this past summer. It's a $1.2 billion investment. I feel like I've worked 30 years on that mission, and there's a threat to it. It's based on a bilateral agreement between the United States and India signed by President Obama. It's more than just a science mission.

It's an alliance between two countries, two important partners in this part of the world. And the fact that they could question this, the existence of this mission – are we going to be able to store all the data? Are we going to have the money to store data and things like that? It would be a terrible waste of funds, resources and time if we affect the mission negatively. And this mission is going to provide data of tremendous value to society. It's going to measure the deformation of the Earth surface with time at a high level of precision, like a GPS network. We can have that coming from space every 12 days for years to come. And somehow, we would close the tap on that. It makes no sense.

But that's the threat we have. I also feel all the scientists, the managers at these agencies, like NASA, NSF or NOAA, are all hardworking people. They're dedicated to what they do. They do it for science to protect society, to protect our human population, to protect our resources, to protect the environment. And I feel like they're a little bit bullied around, being called names and being fired for doing their job. It doesn't make sense. I find it enraging and counterproductive.

The irony of all this is that you could come to a point where we don't know if sea level is rising, and you would base your decision for your house or for your city on belief or ideology. Some may not think sea level is rising, for instance. So they don't want to plan for it, as opposed to actually monitoring the situation. We understand what's happening and what controls it, and how we could change our behavior to change the future. But we refuse to look at that. This is a very dangerous game. I would ask any citizen on the planet; do you want to make decisions in your life based on knowledge or based on ideology?

I tell kids that ideology is simple, because usually it's very naive, very low-level. Don't question it. It's the way it is. Knowledge takes a little bit more effort, but knowledge is about what the real world is about. And ideology is a makeup one. Personally, I want to make decisions based on knowledge. I feel like I'm more in control of my life if I have the data and if I know how things work, than if somebody

tells me, “Eric, you should believe me, sea level is not changing.”

Bell: I’ve heard you say in the past, in interviews with the media and in public speaking events, that you still have hope that we can mitigate the impacts of climate change and build resiliency. How has that level of optimism or hope changed in recent months?

Rignot: I used to say that to Ralph [Cicerone, founding chair of the Department of Earth System Science and former UC Irvine chancellor]. I think I remain hopeful because the voice of reason always ends up slowly, sometimes in a chaotic manner, ends up working. So, all these attacks that we see on science in general right now don’t make any sense. They’re counterproductive. And I don’t think that’s what the average American person wants to see in their country. A denial of science. Let’s forget about science. That’s not fun science anymore. We don’t need it.

This country has actually followed a completely different route. It’s a country that always funded science at a high level. That’s why American science is regarded in the world as the top science, because America invested in it, and they benefit from it. So to suddenly say, we don’t want to do this anymore, is nonsensical.

And I don’t think the American public, if they understand what’s going on right now, if we appreciate what’s going on and the impact it will have, I don’t think they would like that. We are in this weird situation where we are questioning vaccines. This is ideology. This is not knowledge anymore. But I’m still remaining hopeful.

This country is not governed by a president or a number of folks in D.C., it’s governed by the people. It’s a country that elects its leaders. If the people are not happy, eventually they’ll say, this is not what we want to do. I think the people see that we are degrading our environment. Burning fossil fuels causes a lot of problems. It causes pollution, it causes warming, it creates conflict in the world. And there are other ways we could produce our energy. Why don’t we capitalize on this? China is taking the lead right now. They are going full speed on that, and we are going to be sitting in the backseat. This country is not about staying in the backseat. I don’t think the average American person would like to feel like we’re not the trailblazers anymore. We’re dragging behind. Everybody’s laughing at us because we’re so far behind. That’s not acceptable.

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