

# James Cameron shares his deep desires

The director discusses his plans for future ocean exploration and making his technology available to scientists.

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12 September 2012

James Cameron is used to smashing records at the box office with blockbusters such as *Avatar* and *Titanic*, but on 26 March the film-maker set oceanographic records when he made the first solo trip to the Challenger Deep in the bottom of the Mariana Trench, the deepest spot on the planet (see '[James Cameron returns from the deep](#)'). His trip turned the spotlight onto the little-explored 'hadal zone' at the bottom of the ocean's deep trenches (see '[James Cameron heads into the abyss](#)').

*Nature* talked to Cameron about that expedition and his plans for his submersible, the *DEEPSEA CHALLENGER*, and other tools, including autonomous underwater vehicles (AUVs) and landers that drop to the sea floor. He said that he is willing to lend out his equipment if researchers can come up with the funding.



Mark Thiessen/National Geographic

James Cameron in the *DEEPSEA CHALLENGER*.

## What would you say is the biggest scientific result from the expedition so far?

I just had a meeting with members of the science team. They're very excited. We didn't get as many samples as I had wanted, but they say we are going to be publishing for years from what we did get, from samples from the sub, the lander vehicles and the robotic vehicles.

For example, we discovered a giant, possibly new, species of amphipod that is almost a foot long — five times what was expected — in the New Britain Trench at 27,000 feet [8,200 metres]. You've got to remember that these are very energy-constrained environments, dependent on the nutrient flux from miles above. So [the scientists] were very surprised to see animals of that size — and that active.

[In the Challenger Deep], we were able to get some very good images of bacterial mats that may shed some light on what could be very early processes in the emergence of life on Earth.

## Where do you see deep-sea research heading?

That is a question of some debate right now. America has one submersible capable of reaching Titanic-ish depths — in the couple-of-miles range — which these days isn't that deep. So I don't think we're prioritizing deep-submergence research nearly as highly as we should. This has been a common complaint in the deep-submergence community for decades, but it's certainly coming to a head.

The Russian *Mir* submersibles are offline now and whether they will come back online is debatable. So that's a huge loss. The US *Alvin* submersible is coming back online — eventually. And the Chinese have fielded a very deep-diving three-person sub, *Jiaolong*, which looks like it has quite good capability and a 7,000-metre depth limit. So they're moving in the opposite direction, it seems to me, from Europe and the United States.

## Will scientists be able to use *DEEPSEA CHALLENGER*?

As far as I'm concerned, if anybody wants to put up the money to do further expeditions, I'm more than happy to put in the sub and the technology. It's not doing any good sitting in my barn. But I'm making *Avatar 2* and *Avatar 3*, so I won't be able to personally supervise the next expedition. If someone else wants to take it on, I'm more than happy to provide the vehicle and the spares and all the supporting equipment.

## What would you personally like to do with the submersible?

I would like to see it diving again. Or at the very least, I'd like to see the technology used for other vehicles and instrumentation. There is a lot of new tech that was developed for that sub: very powerful, full-ocean-depth lights; very small, lightweight high-definition three-dimensional camera systems that are full-ocean-depth rated; full-ocean-depth-rated thrusters.

My position is: it's open source. If you want it, I'll hand it over to you and show you how we made it work. I don't make my living doing deep-ocean instrumentation — I do it for fun. And I do it for the betterment of science and our understanding of this deep world that has not been explored. You've got a frontier at hadal depth, which would be the equivalent of the size of Australia if you added all the trenches together. And nobody has looked there.

**Is there anywhere in particular that you would like to go?**

I've got a hit list. The Tonga Trench is very interesting because of the geology. You don't have the deep overburden of sediments, so you can see where the rubber meets the road of plate tectonics: one plate actually subducting under another is probably visible, maybe even in the same field of view.

You've got the Japan Trench, which was the source of the very devastating earthquake and tsunami [in March 2011]. There's very little data from the actual bottom of the trench.

I would like to see the sub and the landers working. I'd like to see a new generation of vehicles: full-ocean-depth AUVs, using the technology we developed, that would go out as a fleet and map these trenches.

**Have you got any suggestions to help scientists to get more funding? Or are you going to go to bat for them?**

I'm raising my voice but I'm not sure it's going to do any good. Private entities such as Eric Schmidt [former chief executive of Google and founder of the Schmidt Ocean Institute] have done a lot to try to make up for what governments are not doing.

The public needs to understand that the US government is no longer in a leadership position when it comes to science and exploration, as they were in the 1960s and 1970s. We have this image of ourselves in this country as number one, leading edge, that sort of thing and it is just not the case.

People need to know that, and they need to demand that we do a better job of exploration. There is so much of our world that we live on, and depend on, that we don't understand. When an earthquake can send a tsunami rolling across Indonesia that takes a quarter of a million lives in a few minutes, I think we need to understand what's going on in the deep trenches a whole lot better than we do.

*Nature* | doi:10.1038/nature.2012.11384