Q&A Adam Summers

Fabulous fact fisher

Biomechanist Adam Summers of the University of Washington's Friday Harbor Laboratories has spent much of his life working out how fish move. But he has another role that some would consider more prestigious. As Pixar's 'fabulous fish guy', he advised the animation company on ichthyology for its 2003 hit *Finding Nemo* and the long-awaited sequel *Finding Dory*. On the eve of the sequel's opening, Summers talks about the tension between entertainment and science, being corrected by kids and the wild drama of the piscine world.

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What did Pixar ask you to do for *Finding Dory*?

They presented me with a series of interesting characters, and they wanted to know neat things about these animals. For instance, they asked me about beluga whales (*Delphinapterus leucas*) — and whether the issues

around captive individuals were similar to those for killer whales (*Orcinus orca*). Their questions were less philosophical than for *Finding Nemo*. It was less, 'Do these things think?'; and much more, 'How does it swim?' They did ask me some questions about the biology of whale sharks (*Rhincodon typus*) that we just don't know the answers to. It's the largest fish in the sea, yet I think there's just one record of a pregnant female, which revealed that they can have more than 300 pups at a time. That's not much to know about the reproductive biology of such an iconic fish.

Have you seen the film yet?

I've seen little clips for fact-checking. 'Could this really happen? What does this biomechanically look like to you?' People think that they are not biomechanists. The truth is that every human is an excellent comparative biomechanist, because we evolved in an

environment of being eaten and eating things. And that tunes your brain to the movements of other organisms. What I offered Pixar was that realization, so they could ask, 'This doesn't look quite right, why?' And I could explain what was wrong.

Apart from talking animals, are you pleased that Pixar has been scrupulous on the science?

This question is very important for the entertainment industry: does it matter whether you're right, when you're telling a story to entertain? Under some circumstances, I don't think it matters. But with an animated movie about real, living systems, when you use the truth — their complexity and beauty — as a springboard for the story, you add a level of gravitas that is vitally important to creating a broad and deep appeal. A young audience is much more sophisticated than you think, and a story informed by a lot of facts alerts them to the presence of real concepts. I got an e-mail from an eight-year-old about *Finding Nemo*, explaining that characters could not emerge from a whale's blowhole if they were in its mouth, because there is no link between the trachea and the oesophagus.

Are you worried about increased demand to have fish featured in the film as pets?

When *Finding Nemo* came out, I was incredibly concerned about this possibility. The trade in wild-caught pet fish is inexcusably

destructive. When you see a nice-looking fish in a pet store that was caught in the wild, you should mentally fill that tank with another 50, 80, even 100 dead fish. But big breeding operations do a fabulous job of making exotic, very cool fish available. If you can keep captive-born clownfish on coral that's been grown in captivity, I think you're doing a great thing. You're building a relationship with the sea: keeping a saltwater aquarium is a great little lesson in the complexity of an ecosystem. It is not by chance that shortly after *Finding Nemo* reached cinemas, captive breeding of clownfish became possible.

Is there anything you would change about *Finding Nemo*?

In the 13 years since it came out, I've had more than 100 inaccuracies pointed out to me. Only one is an actual error. The rest we decided to allow to push the story along, or because the characters needed to have some anatomy that didn't exist. The claspers — external, stick-like sexual organs on sharks — were cut off Bruce the great white shark, not because of family values, but because he's spherical, and when you add a bunch of sticks to spherical sharks, they look really stupid. Someone proposed that Nemo's father Marlin should have turned into a female fish when Nemo's mother died, because a real clownfish would have changed sex after removal of the dominant female. We knew that, but I did not think it was a good opportunity to teach young people about sex changes in fish. That seemed like it would be confusing.

What was one of the one complaint that you think was legitimate?

It's a nomenclature error. One person pointed it out, and I watched the movie again, and by golly, one of the characters uses the wrong word to describe something. I just didn't catch it.

Is there any further aspect of marine biology that you would like to see in these films?

There are more than 25,000 species of fishes. Fish do everything imaginable. When sand tiger sharks (*Carcharias taurus*) reproduce, the first embryos that come down the oviducts eat all the rest. If I ran Pixar, there would be a new Nemo movie every eight or nine months, with all-new characters. Romantic comedies. Horror movies. The entertainment industry could devote itself entirely to explaining fish, without any trouble at all.

Which is your favourite character?

The one I think of as me — the ray, the professor. Very under-utilized. Not enough lines. Really, he probably should voice-over the whole movie. Or have his own spin-off. ■

INTERVIEW BY DANIEL CRESSEY

This interview has been edited for length and clarity.