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SCIENCE

Why do ducklings swim in single file? Just ask this prize-winning West Chester scientist named Fish.

Frank Fish, a West Chester University biologist, won an 'Ig Nobel' Prize. It's a spoof of the real Nobel.

West Chester University biology professor Frank Fish won an "Ig Nobel" prize, in honor of his research on why ducklings swim in a line.

Jose F. Moreno / Staff Photographer

by Tom Avril
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Hanging from the ceiling of the scientist's office is a hat in the shape of a giant squid. Nearby are toy ducks and whales, along with mementos from the movies *Finding Nemo* and *Jaws*.

When your name is Frank Fish and you study aquatic creatures for a living, you'd better have an appetite for fun.

Fish is a longtime biology professor at West Chester University with decades of serious research under his belt, some of it funded by the military. But at long last this month, he won an award that celebrates his lighter side: an Ig Nobel Prize.

The international awards, now in their 32nd year, are an "ignoble" spoof of the real Nobel Prizes, poking fun at research that is serious, yet sounds more than a bit off-the-wall. Recipients are in on the joke — none more so than Fish, who was honored for his study of why ducklings swim in single file behind their mothers.

Upon accepting this year's Ig Nobel in Physics, along with a fake $10 trillion bill, he assured the audience in a Sept. 15 online ceremony that the honor would not be his "swan song."

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the honor would not be his "swan song."

"I definitely feel like a lucky duck," he said.

What more could be expected from a man who, when he taught zoology, wore a different animal-themed T-shirt every day of the semester? Or one who, when teaching his anatomy students about muscle control, used his martial-arts training to break wooden boards? As Fish, also a published cartoonist, writes in his email signature: "You're not doing science if you're not having fun."

When biologist Frank Fish studied how ducks move efficiently through the water, he used real ones, not these toys in his West Chester University lab.

Jose F. Moreno / Staff Photographer

Underlying all of it is a deep appreciation for a scientist he could never hope to match: nature. Fish specializes in studying how animals move through the water, and after millions of years of evolution, he says they generally have come up with better, more efficient strategies than any human scientist could ever imagine.

So Fish copies them.

In one project, funded by the Office of Naval Research, he is working with Yale University colleagues to develop an underwater robot inspired by sea turtles. In another, he is collaborating with scientists at Drexel University and George Washington University on robots that mimic the movements of sea lions.

It's all about the hydrodynamics. For instance, a fin or flipper might be shaped a certain way that enables the animal to better glide through the water, or perhaps turn on a dime.

"Nature's done the cost-benefit analysis," he said.

In his lab at West Chester University, Fish creates 3D models of various animal body parts and tests their properties in a flow tank. Some of the models are made from videos of animals in action, while others are made from carcasses recovered by marine mammal stranding centers — requiring Fish to obtain special permission from federal regulators.

At his West Chester University lab, Frank Fish studies models of animal limbs such as these flippers from sea lions and fur seals.

Jose F. Moreno / Staff Photographer

In other cases, he measures the movements of animals in real life.

That's what happened with the duckling research, back in the 1990s. Fish and his students used two techniques to gauge how much energy the birds used when paddling in a water tank. In one set of experiments, the team used an instrument to measure the birds' oxygen consumption. The other required capturing the ducklings' movements on video, then measuring how much they moved their legs.

Therein lies a bit of scientific controversy, which bubbled up during the Ig Nobel ceremony.

Fish shared his award with a team of scientists from China and the United Kingdom, which came up with a different explanation for why ducklings' single-file formation is so efficient.

The other group found that the key is how the birds position themselves on the waves created by their mother's wake, riding the crests almost like surfers. Fish, on the other hand, found that ducklings are helped along by swirling vortices that the mother's paddling generates on either side of the wake.

During the award ceremony, host Marc Abrahams attempted to broach the subject without ruffling any feathers.

"Do the two groups completely agree on what was discovered?" he asked.

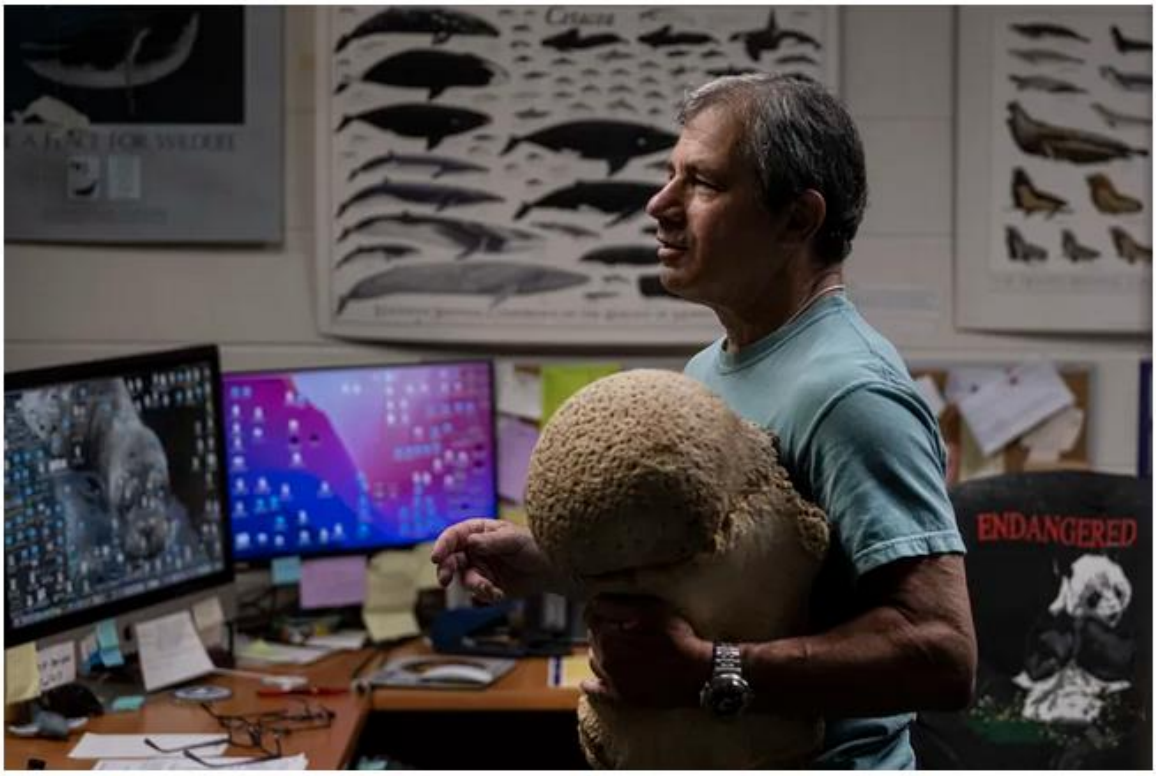
Everyone chuckled. Fish was gracious, proposing that perhaps both phenomena were at work.

“The main thing that we come to full agreement on is that there is a mechanism, or maybe several mechanisms, in which the ducklings can get a real advantage by swimming one behind the other,” he said.

Organized by the Annals of Improbable Research, a magazine that Abrahams edits, the awards are cosponsored by the Harvard-Radcliffe Society of Physics Students and the Harvard-Radcliffe Science Fiction Association.

At a glance, the research honored with Ig Nobels may sound like one of those lists of “wasteful” studies, compiled by scowling, anti-science politicians. Quite the opposite. The event celebrates research that may sound silly, yet is fueled by a spark of curiosity and wonder.

Among other winners this year were researchers who studied why legal documents are hard to understand. (The answer: It's not the tricky concepts, but simply bad writing.) Another group discovered that when two people hit it off on a blind date, their hearts start to beat in unison. Then there was the Swedish researcher who fashioned a rubber crash-test dummy in the shape of a moose, then rammed it with cars. (Moose collisions are a big deal in Sweden, apparently.)



Frank Fish holds a humerus bone from a humpback whale, one of more than 60 species he has studied in his lab at West Chester University.

Jose F. Moreno / Staff Photographer

“The crash test results were very pleasing since the demolished cars looked very much like cars involved in real moose crashes,” the author wrote in his 2001 study.

During the ceremony, each award was bestowed by a past winner of an actual Nobel Prize. In Fish’s case, it was Columbia University’s Martin Chalfie, who won the 2008 Nobel in chemistry.

Chalfie joked that this year’s physics prize should be named in honor of Robert McCloskey, author of the children’s classic *Make Way for Ducklings*.

“It’s nice to know how they actually make their way,” he said.

The announcement of each award was heralded with a blast from a trombone. Musicians also performed a comic opera, riffing on the word *epistemology* (the study of knowledge). Toward the end, everyone celebrated by throwing paper airplanes.

Fish was in his element.

And for once, no one made a crack about his name.

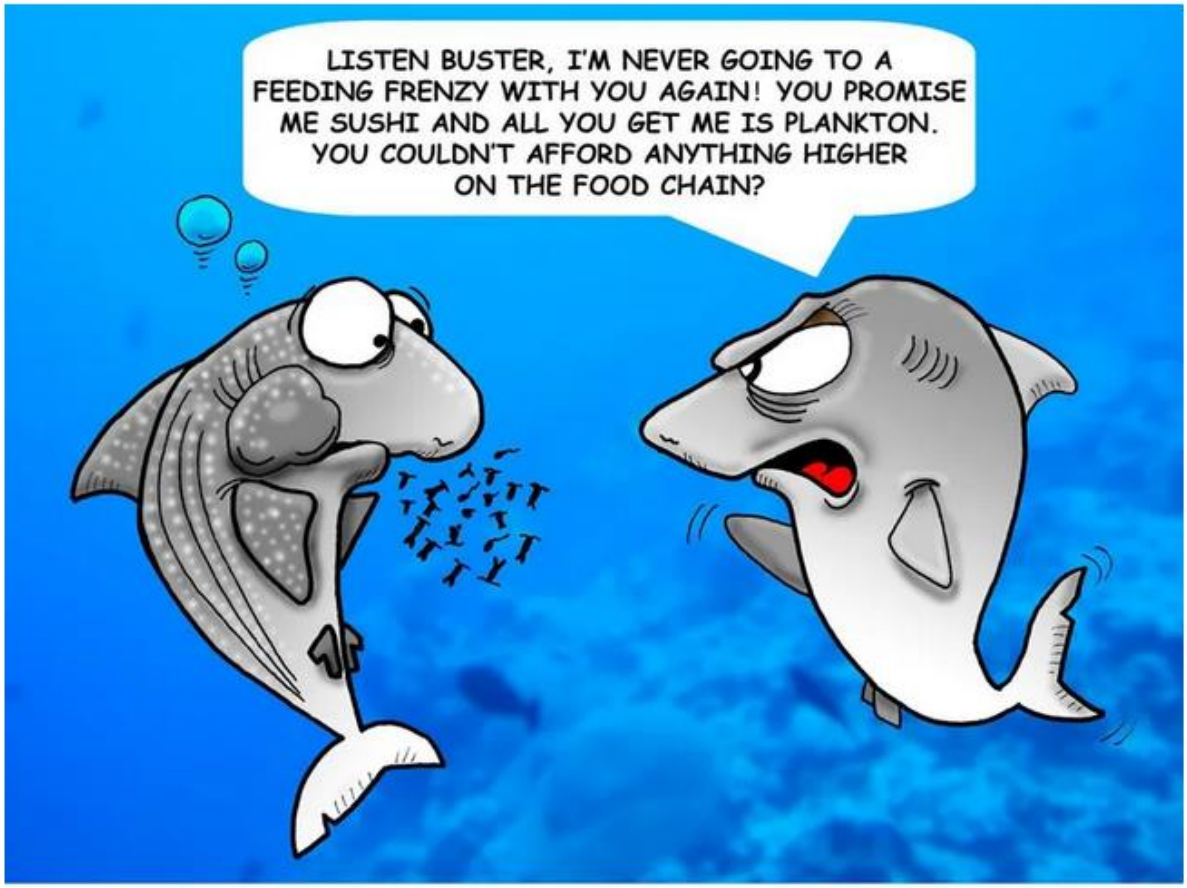
About that: Upon meeting Fish and learning that he studies fish, among other aquatic creatures, nearly everyone responds with some predictable version of “How appropriate!” or “You’re kidding!” It got old decades ago, but Fish has made his peace with it.

And good luck trying to come up with an original remark. He's heard them all.

Perhaps the joking is better left to the man himself.

Once, when speaking to a group of scientists, he vowed to deliver a "super talk by Fish."

Instead of — he said after a pause — a "super-fish-al talk."



THE DISADVANTAGES OF BEING A FILTER FEEDER

Frank Fish, an aptly named biologist who studies fish and other aquatic creatures at West Chester University, is also a cartoonist.

Frank Fish

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