Bringing AI Into the Fold to Probe Protein Potential

An interview with the **2023 Canada Gairdner International Award laureates:**
Demis Hassabis and **John Jumper**
Google DeepMind

Demis Hassabis

I've been working pretty much my entire career on artificial intelligence and trying to progress the state of the art in artificial intelligence, but I always had the aim to build it as a tool to accelerate scientific discovery. And obviously AlphaFold and protein folding was the first big challenge that we applied it to.

John Jumper

AlphaFold is a deep learning system, a type of AI system, which predicts something called protein structures that biologists do to understand what goes on in the cell and what goes wrong, for example, when you have a disease.

Demis Hassabis

Proteins are the workhorses of biology, and pretty much every function in your body is supported by a protein. But what a protein does in your body is determined by its 3D structure. And so the protein folding problem articulates

this idea of, can you predict what the 3D structure will be just from the amino acid sequence? And that, in essence, is what we built the program AlphaFold to solve.

John Jumper

Since we have so many proteins — we have, you know, 20,000 protein-coding genes — there's this enormous set of problems that we need to solve to get this whole picture, really, to get a kind of parts list of the cell so that we can do more science and better science on top of it.

Demis Hassabis

When we completed AlphaFold, we actually open sourced the code, and we folded all 200 million proteins pretty much known to science and made it freely available and accessible to any researcher in the world for any purpose.

John Jumper

So I remember getting a mysterious email from (Gairdner president) Janet (Rossant) saying she'd like to have a call with no details. And a call with no details is either very good or very bad, so I was thrilled that it was about the Gairdner.

Demis Hassabis

Canada itself created a lot of the new AI booms. A lot of the researchers responsible for that were based in Canada and still are. So it's sort of quite poignant, I think, that it's a Canadian award for what essentially is applying AI to a Grand Challenge in biology.

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