Computer Scientist Models Global Ecology

Drew, who heads the Computational Ecology and Environmental Science group at Microsoft Research Cambridge, UK, published the first-ever mechanistic general ecosystem model in April. This tool simulates the interactions of all organisms on Earth and the underlying mechanisms that govern biodiversity patterns, which may help to predict how invasive species or pollution shape the world.

A .....?

"Stephen, our head of computational science, likes to take a broad-sweep approach to science. One day he asked: "Why don't we model all life on Earth?" I was sceptical but I like a challenge, and we wanted to do something that would be useful for the conservation community. It took four years, and the model turned out to be unusual - we couldn't model every individual species, so the key development was figuring out how to properly simulate nature using realistic and rigorous approximations."

B.....?

"I got into computer programming when I was 7 - I got a Commodore 64, one of the first home computers. Around age 14, I watched a documentary about artificial life, and started reading about how to simulate life through a computer. Looking back, I realize now that my interest as a student in examining real-life processes of ecology and evolution at the University of Cambridge evolved from my interest in studying artificial life."

C.....?

"In 2001, I was lucky enough to get a postdoc with an ecologist and evolutionary biologist, John, at Princeton University in New Jersey. He had just become director of the Princeton Environmental Institute, which had support from the global oil company BP and the US car manufacturer Ford. As a result of working with him, I met several senior executives from these companies who wanted to do cool and risky stuff, such as carbon capture and storage. After meeting them, I

was more open to considering the Microsoft research job when it came up. Before I had those experiences, I had presumed that big corporations were evil and only out for profit."

D.....?

"The job advertisement sounded ambitious. They said they wanted a computational ecologist, a phrase I had never heard before, but it sounded like what I wanted to do. In many ways it didn't make sense to take this position when I was starting to get offers to do the academic jobs I had trained for. But I rationalized that there would always be university jobs available."

E.....?

"There is no predefined idea of success here. There is an expectation that what we are doing will have an impact on society, but that impact could take the shape of high profile publications or software development that could enhance the field of computational ecology. It makes me weep that in academia we take the cleverest people in society and rank them on a single dimension - their publication record. At Microsoft, we do not have to pursue predefined ideas. I can follow my interests - helping humanity to achieve a better understanding of nature and the biosphere we all depend on. My group is a small team with limited resources, but we take on big projects, such as predictive modelling of global agriculture."

F.....?

"I want to run more scenarios to see how well real-world data fit our model and to try, for example, to predict outcomes under different climate conditions. I'll use the results to explore interesting applied questions as well; for example, I would like to simulate Australia's cane-toad invasion. We need to find ways to sufficiently connect our models to existing data; with enough of those links, we can put realistic limits on the model to learn how and where it works best. In my darkest moments, I wonder whether this is still science. But surely it's science in the same way that we model how galaxies are formed?"

Questions 1–6

For paragraphs A-F, choose the correct heading (i-viii). There are TWO extra headings YOU WILL NOT NEED TO USE.

i How does working at a university compare with working for Microsoft?

ii What problem did you have with your work?

iii How did you enter this field of research?

iv Can you explain the path which led to your ecosystem model?

v Where do you go from here?

vi How did your first academic post influence your career?

vii Can you explain your work in Australia?

viii What convinced you to specifically apply to Microsoft?

A .....

B .....

C .....

D .....

E .....

F .....

Questions 7–10

Based on information in lines 1-27 of the text, are the following statements true or false. Choose from TRUE (T), FALSE (F), DOES NOT SAY (D/S)

7 The model could explain the impact of non-native plants and animals on the environment. .....

8 Drew felt confident the model would be a successful project. .....

9 There were about sixty species that Drew's research group wasn't able to simulate. .....

10 Drew has not changed his mind about multi-national companies. .....

Questions 11–12 (lines 28–40)

Choose TWO letters (A - E). Which TWO facts about Drew are mentioned IN LINES *28-40 of the reading?*

A His main obligation is to produce software.

B Microsoft was not his only work opportunity.

C He did not want to work at a university.

D He is unhappy about how researchers are judged.

E Microsoft decides the projects he must work on.

Question 13–14 (lines 40–50)

Complete the sentences below. Choose NO MORE THAN THREE WORDS from lines 40 -50 of the text for each answer

13 Despite the fact Drew's team has ...., it still works on large-scale research.

14 Drew is interested in evaluating the accuracy of the information generated by his model by making more comparisons with ....