Dr A.H. Heineken Prize for Environmental Sciences 2014, awarded to Jaap Sinninghe Damsté

Ladies and gentlemen,

For a long time, geologists who wanted to learn about our planet's ancient history have used fossils to do so.

Fossils are rare leftovers from plants or animals, the remains of which accidentally stood the test of time. They got buried under layers of sediment, for example, before that sediment turned into rock.

We all have seen images of fossilised skeletons of ancient birds, rodents or fish, clearly visible to the eye.

Jaap Sinninghe Damsté has brought the art of fossil finding to much smaller levels. He searches rocks not for skeletons but for invisible remains: chemical, molecular traces such as DNA fingerprints.

Just like bones, biochemical evidence can prove that a particular organism lived at a particular place millions of years ago. Better still, molecular fossils, as we now call them, can identify microscopically small ancient organisms such as bacteria and algae. They can even tell us how bacteria changed over time.

Jaap Sinninghe Damsté has, for example, studied subtle variations in the membranes that surround unicellular organisms living in the oceans.

Those variations, he found, correspond with changes in the temperature of the sea water. That means that we can use those biochemical traces as a thermometer. We can take samples from ancient rocks and measure sea water temperatures from a very, very long time ago.

That is how we now know that fifty million years ago, Arctic ocean surface water was about as warm as the subtropical pool your children swam in last summer.

It is just one way in which molecular fossils have added to our knowledge of the history of the Earth, its oceans and its atmosphere.

Ladies and gentlemen,

Jaap Sinnighe Damsté began his career as a chemical engineer, but as he became more interested in biology and geology, he managed to weave those fields together.

Thanks to his pioneering work, organic geochemistry is now a part of microbial ecology, of oceanography and of paleoclimatology. His techniques can be found in the toolboxes of researchers worldwide. They continue to deepen our understanding of the history of our living planet.

Ladies and gentlemen, will you please join me in honouring Jaap Sinninghe Damsté, winner of the 2014 Heineken Prize for Environmental Sciences.