

## THE NOBEL PRIZE IN CHEMISTRY 2021



**David W.C. MacMillan**

*Born: 1968, Bellshill, United Kingdom.*

*Affiliation at the time of the award: Princeton University, Princeton, NJ, USA*



**Benjamin List**

*Born: 11 January 1968, Frankfurt, Germany.*

*Affiliation at the time of the award: Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, Germany*

The Nobel Prize in Chemistry 2021 was awarded jointly to **Benjamin List** and **David W.C. MacMillan** “for the development of *asymmetric organocatalysis*”.

Many research areas and industries are dependent on chemists’ ability to construct molecules that can form elastic and durable materials, store energy in batteries or inhibit the progression of diseases. This work requires catalysts, which are substances that control and accelerate chemical reactions, without becoming part of the final product. Our bodies also contain thousands of catalysts in the form of enzymes, which chisel out the molecules necessary for life.

Catalysts are thus fundamental tools for chemists, but researchers long believed that there were, in principle, just two types of catalysts available: metals and enzymes. **Benjamin List** and

**David MacMillan**, independent of each other, developed a third type of catalysis. It is called asymmetric organocatalysis and builds upon small organic molecules.

Organic catalysts have a stable framework of carbon atoms, to which more active chemical groups can attach. These often contain common elements such as oxygen, nitrogen, sulphur or phosphorus. This means that these catalysts are both environmentally friendly and cheap to produce.

Organic catalysts can be used to drive multitudes of chemical reactions. Using these reactions, researchers can now more efficiently construct anything from new pharmaceuticals to molecules that can capture light in solar cells. In this way, organocatalysts are bringing the greatest benefit to humankind.

<https://www.nobelprize.org/prizes/chemistry/2021>