Hume can be considered the pinnacle of modern philosophy in a historical sense. He is the last philosopher to stake a claim on the rationalist / empiricist debate of that time. Hume is an extreme empirical skeptic - to the degree that scientific causation is just a primitive habit. He doesn't subscribe to Locke's picture of external order or Berkeley's picture of idealism/occasionalism.
My opinion is that his view of causation is closer to Leibniz's view - but this is debatable.
His views on causation really turned philosophy upside down since he dismissed our ability to make uniformity intelligible. That is - coming to this point, there is a clash between religion and science when it comes to explaining how the world works.

The early modern period is still adhering to the view that certain objects are created by God as possessing a set of properties. Cows are cowlike, cars are carlike etc…
But with galileo comes along this idea of corpuscularianism. The idea that there is no essential feature of cows or cars, its just a bunch of small objects arranged in a certain way. So movement and size and shape are all dependent upon the arrangement of simple objects (like atoms) - not upon any essential characteristic of some thing.

So Hume is at the bubbling point of this debate, he is strung between a religious type of essentialism and a purely causal external-world theory of determined events.

And he thinks they are both wrong. He doesn't think there is any such thing as cause and effect, there is no occasionalism or determined process. He just thinks that we have an expectation between one event and another event - such that we wish for uniformity - that past knowledge can help us predict the future. We are no different from any other animal in this regard. Like when your dog learns what certain commands mean - when the dog hears "walk" and sees you grabbing the leash, she gets excited because she has an expectation that you will take her on a walk. The same type of uniform expectation occurs with us and our science. Such that the laws of science are just illusory lists of expectations (most scientists and physicists recognize this as mostly true)

This explanation of causation is supposedly what awoke Kant from his "dogmatic slumbers". Kant vehemently disagreed with Hume that causation was just an illusion. So understanding Hume gives us a lens by which we can understand Kant. In a way, we don't get to Kant without Hume. While Kant is still considered to be the greatest philosopher since Aristotle, there are many who believe his project is just too vast. Many still believe that Hume got closer to the truth than Kant did when it comes to causation. However, Kant delved much deeper into philosophy than Hume. One cannot approach western philosophy without crossing paths with Kant at one point or another.

Friend's Video: https://www.youtube.com/watch?v=MTbZoKEOkUg
Zizek Video: https://www.youtube.com/watch?v=PRMUhZTz924

So let's start with how Hume believes we come to associate ideas with each other. This is very similar to Locke:

Stanford:
Although we are capable of separating and combining our simple ideas as we please, there is, nevertheless, a regular order to our thoughts. If ideas occurred to us completely randomly, so that all our thoughts were "loose and unconnected", we wouldn't be able to think coherently (T 1.1.4.1/10). This suggests that

> There is a secret tie or union among particular ideas, which causes the mind to conjoin them more frequently, and makes the one, upon its appearance, introduce the other. (Abstract 35)

Hume explains this "tie or union" in terms of the mind's natural ability to *associate* certain ideas. Association is not "an inseparable connexion", but rather "a gentle force, which commonly prevails", by means of which one idea naturally introduces another (T 1.1.4.1/10).

Ideas can be broken apart and reassembled in an infinite amount of ways, but they just hang together.

The means by which ideas are associated are *resemblance, contiguity of space and time, cause and effect.*

Resemblance - One idea is similar to the other.
Contiguity of space and time - One idea is close to another in space or time
Cause and Effect - One idea seems to be caused by another in a uniform fashion.

Cause and Effect is the most primary distinction we make.

There are two different types of propositional statements which are at work in modern philosophy:
What Kant calls the a priori / a posteriori distinction.
Hume has a similar distinction known as relations of ideas and matters of fact.
Leibniz made a distinction between truths of reason and truths of fact

So there is a common thread here at work.

For Hume, relations of ideas are truths based upon the type of idea they are. They have nothing to do with facts about the world. Relations of ideas would be "All bachelors are unmarried" or "3 times 5 is half of 30". These are what we now call "analytic statements".

Relations of ideas tell us something about how we think - since all languages seem to latch on to similar relations of ideas. So we aren't necessarily talking about words when it comes to relations of ideas.

Matters of fact are a little bit tricky because they are what we call "synthetic" - statements which cannot be proven by logical analysis of ideas. So examples of synthetic statements would be "We are at pierce college" or "If I drop this pen, it will fall".

Now, within matters of fact, there are two ways which I can prove something to be true:
1. Memory - "It was raining yesterday"
2. Perception - "It is raining right now"

Now, we seem to believe there is a third way which we can prove matters of fact - by cause and effect.
3. Cause and Effect - "If I drop this pen, it will fall"

And this is where Hume takes issue. He thinks that 3 is just an assumption we make: we assume there are laws of Physics, but those "laws" are really just the fulfillment of certain expectations.

It is Habit - not reason which leads us to make predictions. In this sense, our "science" is no different than the learned behaviors of animals. Our habitual awareness is not different in quantity than the type of behavior exhibited in non-human animals - it only differs in a greater degree.

But then this leads us down a slippery slope: why not read tea leaves, why not believe in superstition.

Hume: even those who believe in superstition act upon the assumption of uniformity. It is just how we work. We should go with a system which delivers the most consistent results - science is much more consistent than superstition. Still, science is only a type of habitual behavior identification. Causation is nothing more than our expectations.

Probability > Law

Quantum Mechanics is based upon probability.