We considered a case where an object is moving along the surface, but now let's consider what happens, that if we apply a force here, and the object stays at rest.

Well, we still have the normal force distributed over the surface.

But now because the object is at rest, there is another kind the contact force now is what we call static friction, the tangential part of that.

And the contact force is still the perpendicular part, the normal force, plus the tangential part, which we refer to as static friction.

Now what happens with static friction is that if we don't apply a force at all, then there is no static friction.

In fact, you can see in this simulation, that if we slowly increase the applied force, then the static friction force gets bigger and bigger.

It depends on what we're doing to the system.

But at a certain point, when we apply a large enough external force, the object suddenly starts to slip.

That's what we call the just-slipping condition.

And the reason for that is static friction has reached its maximum possible value.

That has to do with the physics of the interaction between the surface and the object.

So also, there's a very subtle thing, is that as you see when we pull the force and it just slips, suddenly the friction has gone from static to kinetic friction, and it's gotten a little bit smaller.

How do we express those properties?

Well, what we have is the idea that the static friction can vary in magnitude between 0 and some type of maximum value, depending on the other constraints on the system.

And the maximum value of static friction, we have a force law, which is that it's, again, proportional to the normal force, but the coefficient is called now the coefficient of static friction.

And this coefficient of static friction is slightly bigger than the coefficient of kinetic friction, which explains why that arrow got a little bit smaller when it just started to slip.

Now again, like kinetic friction, static friction is opposing this external force.

And depending on the direction that the object moves, for instance, if we applied the external force in the opposite direction, here, then the static friction that's distributed over the surface is opposing that force.

But there may be many systems in which we're actually not quite sure which way the static friction points.

And as the course develops and we look at more complicated examples, we'll see that the direction of static friction can depend on all the other constraints on the system.