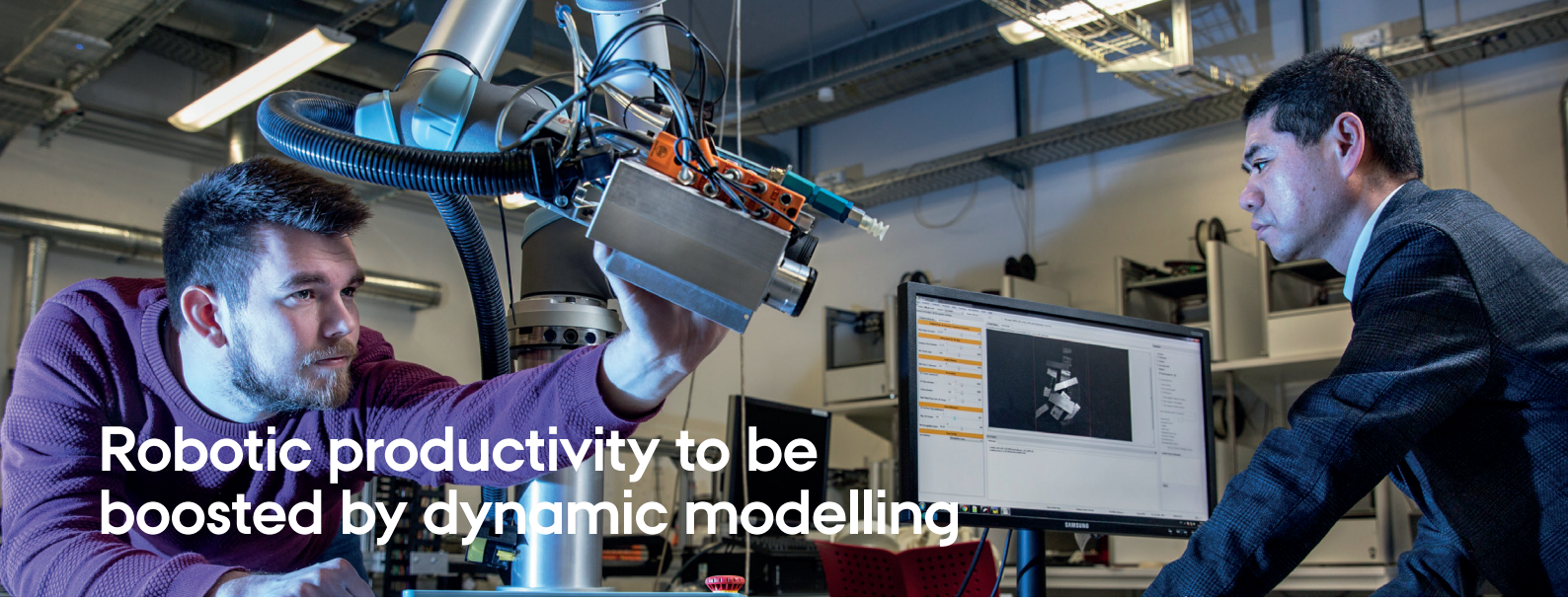

Robotic productivity to be boosted by dynamic modelling

The world's leading manufacturer of collaborative robot arms has joined forces with Aarhus University to dampen the vibrations that occur when the robot arms move.

Imagine a row of robot arms that carry out pre-programmed work with superhuman speed and precision – assemble a car, take laboratory samples, or something else completely. Industry has made significant progress since the time when everything was assembled by hand, and it can be hard to imagine that the robots do not accomplish the job as quickly as possible.

But they actually do not. This is because the robot arms generate energy when they move from A to B, and when the arms stop, the energy triggers mechanical vibrations. In other words, if the work requires a high level of precision, the robot has to stop vibrating before it can do what it is meant to.

This can mean delays of a few seconds for each operation, which ultimately makes production more expensive.

Universal Robots in Odense is the world's leading manufacturer of collaborative robot arms – robot arms that do not require shielding, but which can work closely alongside humans.
The company has now teamed up with AU Engineering, Aarhus University, to reduce the amount of vibration during movement. This will mean robots with increased productivity, precision and versatility.

Extremely small margin of error
Precise dynamic modelling will be used to optimise the robots.

"Based on the robot's dynamic properties, we can determine the best way possible to move from A to B, so we avoid introducing vibrations in the system," says PhD student Dan Kielsholm Thomsen, who is researching the problem.

Robot arms that mount elements on a circuit board, for example, have an extremely small margin of error. Here it is no good having a robot arm that vibrates, even though the amplitude of the movement is less than one millimetre.

Using active vibration suppression, Dan Kielsholm Thomsen hopes to reduce the vibrations to a tenth. This can significantly speed up production at the same time as increasing the service life of the arm as the vibrations can be hard on gears and joints in the long run.

"If there are endless ways of moving from A to B, which movement is the best? We need to be able to determine this in a fraction of a second, so calculations are necessary," says Dan Kielsholm Thomsen.