

The presenter talks about how he use simulation in the designing of everyday things and help improve life experience of people, how simulation could help modeling minor factors required for subtle variations. One of the examples is about "toilet paper and diapers". The factors included in the simulations are on the level of ingredients, molecules, and fluid chemicals, etc. Simulation allows us to see what is not able to be seen in imcomputerised engineering, and let us optimize the performances by controlling target factors.

"Essentially, we're trying to replace experiments with computation." So that supercomputers play a large part in this endeavor. The presenter's worrying that because of Moore's law and bigger dataset, we are going to have a software challenge, however people are not working on softwares nowadays but tending to work on softwares for that they are more exciting. The presenter address the needs of software solutions for some kinds of simulation problem. "We're in the business of science and improving life...and that's going to require a relentless pursuit of realism. Our models need to become higher and higher fidelity because they're trying to replace more and more complex life... For those scientists in the room we must have software that both spatially and temporally scales write finite element, and some of these other codes like molecular dynamics so scale well spatially... I need to compress time. I need tomorrow's weather to be part of an ice age prediction..."

And he said that the computational skills are going to be part of every scientist and engineer base, it isn't going to be just the realm of the computer science or just the realm of the computational guys, it will be part of all of our education.

The presenter also discussed how does one know the simulation closely corresponds to reality, which is a practical question. He used an example of crash testing, in which the person doing the testing messed up with the result and render it unusable. He concluded that we have to accept the conclusion if itself has enough fidelity. We might be looking somewhere else and see if there's something missing if the experiment result is unrealistic.