Modeling of internal friction adds new wrinkle to realistic simulation of cloth behavior

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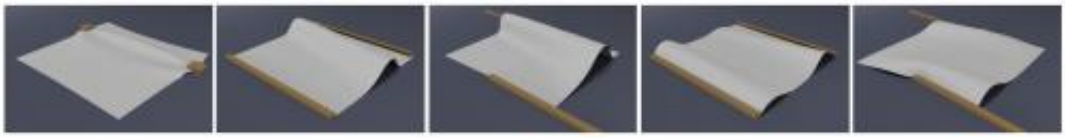

Most people try to keep clothing wrinkle free, but computer graphic artists, striving for realism in computer simulations, take pains to be sure clothing wrinkles, folds and stretches naturally. A new computer modeling technique developed by Disney researchers and academic collaborators addresses this problem.

The new modeling technique seeks to replicate cloth's tendency to preferentially develop wrinkles and folds in areas where they have previously occurred. The researchers accomplished this by incorporating models for internal friction – the resistance of a material to bending, stretching and compression.

"Many researchers have identified internal friction as a source of this effect, but until now no one had incorporated it into computer animation models of cloth," said Rasmus Tamstorf, senior research scientist at

Walt Disney Animation Studios.

Plasticity models, which account for permanent changes in shape when force is applied, are another way to simulate these persistent folds and wrinkles, noted Derek Bradley, associate research scientist at Disney Research, Zürich. But plasticity models work best only when large forces are at play. By contrast, the internal friction models responded to even modest loads and proved more suitable for "locally persistent wrinkles."

Tamstorf and fellow researchers from Disney Research, Zürich, Cornell University, MIT and URJC Madrid adapted a widely used general model for internal friction with good results. They will report their findings at the SIGGRAPH Asia 2013 conference, November 19-22, in Hong Kong.

In addition to improving the modeling of persistent or preferred wrinkles and folds, internal friction results in more realistic stretching and rebounding of cloth. Because it resists motion, internal friction also can help simulated wrinkles settle in one place faster once a character's motion stops, said Eder Miguel, a Ph.D. student in the Modeling and Virtual Reality Group at URJC Madrid.

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