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Biomechanical Analysis of Locust Jumping in a Physically Realistic Virtual Environment DAVID COFER, GENNADY CYMBALYUK, Georgia State University, WILLIAM HEITLER, Univ. of St. Andrews, DONALD EDWARDS, Georgia State University — The biomechanical and neural components that underlie locust jumping have been extensively studied. Previous research suggested that jump energy is stored primarily in the extensor apodeme, and in a band of cuticle called the semi-lunar process (SLP). As it has thus far proven impossible to experimentally alter the SLP without rendering a locust unable to jump, it has not been possible to test whether the energy stored in the SLP has a significant impact on the jump. To address problems such as this we have developed a software toolkit, AnimatLab, which allows researchers to build and test virtual organisms. We used this software to build a virtual locust, and then asked how the SLP is utilized during jumping. The results show that without the SLP the jump distance was reduced by almost half. Further, the simulations were also able to show that loss of the SLP had a significant impact on the final phase of the jump. We are currently working on postural control mechanisms for targeted jumping in locust.

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