

Abstract Submitted
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Modeling and characterizing cell growth in moss STEVEN VANDAL, KYLE LEMOI, Department of Physics, Worcester Polytechnic Institute, Worcester, MA, USA, XINXIN DING, SUPRIYA AGRAWAL, LUIS VIDALI, Department of Biology and Biotechnology, Worcester Polytechnic Institute, Worcester, MA, USA, ERKAN TUZEL, Department of Physics, Worcester Polytechnic Institute, Worcester, MA, USA — The moss *Physcomitrella patens* is an excellent model organism due to its simple development, complete well-annotated genome sequence, and powerful genetics. In this work, we developed a coarse-grained model of moss growth which can be used to characterize the plant's early development composed of protonemal cells. To understand the morphology of the developing plants, we measured various metrics including their area, solidity, eccentricity, circularity, and fractal dimension. We then created a model of moss growth based on L-systems that recapitulates experimental results. We quantified the age of individual plants by their morphological characteristics using the plastochron index, and compared our results to those obtained by classifying the plants by time. The model can be used to detect changes in the moss plant shape through comparison to wild-type plants in metric-space, and will provide further insight into characterization of different mutant phenotypes with altered plant development.

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