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Submission Title: Developing a 3D animation for deeper molecular understanding of Michaelis-Menten enzyme kinetics

Poster Abstract (max 250 words): The mathematical models that describe enzyme kinetics are invaluable predictive tools in numerous scientific fields. However, the daunting mathematical language used to describe kinetic behaviour can be confusing for life science students; they often struggle to conceptualize and relate the mathematical representations to the molecular phenomena occurring at both macroscopic and microscopic levels. Students with less developed abstract and mathematical thinking skills may benefit from a visual learning approach. The paucity of visual resources for enzyme kinetics makes this a fertile field for developing novel learning media. We discuss developing a 3D animation aimed at introducing key concepts of Michaelis-Menten enzyme kinetics to undergraduate life science students. This animation uses both realistic and metaphoric depictions of the underlying molecular players, environments, and interactions in enzyme kinetics to contextualize and explain the relationship between the mathematic models and underlying molecular system. In addition, we will present our production pipeline and workflow for creating educational animations as well as didactic strategies that maximize clarity and accessibility in animated media.

Citations:

1. Levitus, M., & States, U. (2010). Chemical Kinetics at the Single-Molecule Level. Journal of Chemical Education, 88(2), 162–166. http://doi.org/10.1021/ed100371m

2. Ashby, M. T. (2007). Appreciating Formal Similarities in the Kinetics of Homogeneous, Heterogeneous, and Enzyme Catalysis. Journal of Chemical Education, 84(9), 1515. http://doi.org/10.1021/ed084p1515

3. House, C., Meades, G., & Linenberger, K. J. (2016). Approaching a Conceptual Understanding of Enzyme Kinetics and Inhibition: Development of an Active Learning Inquiry Activity for Prehealth and Nonscience Majors. Journal of Chemical Education, 93(8), 1397 – 1400. http://doi.org/10.1021/acs.jchemed.5b00562

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