

Abstract Submitted  
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**Biotic games and cloud experimentation as novel media for biophysics education** INGMAR RIEDEL-KRUSE, Stanford Department of Bioengineering, PAULO BLIKSTEIN, Stanford School of Education — First-hand, open-ended experimentation is key for effective formal and informal biophysics education. We developed, tested and assessed multiple new platforms that enable students and children to directly interact with and learn about microscopic biophysical processes: (1) Biotic games that enable local and online play using galvano- and photo-tactic stimulation of micro-swimmers, illustrating concepts such as biased random walks, Low Reynolds number hydrodynamics, and Brownian motion; (2) an undergraduate course where students learn optics, electronics, micro-fluidics, real time image analysis, and instrument control by building biotic games; and (3) a graduate class on the biophysics of multi-cellular systems that contains a cloud experimentation lab enabling students to execute open-ended chemotaxis experiments on slimemolds online, analyze their data, and build biophysical models. Our work aims to generate the equivalent excitement and educational impact for biophysics as robotics and video games have had for mechatronics and computer science, respectively. We also discuss how scaled-up cloud experimentation systems can support MOOCs with true lab components and life-science research in general.

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