

Learning with amoeba aboard the BioBus

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1. INTRODUCTION

Why are certain groups underrepresented in science careers? Lack of college preparation [5] and poverty [6] are strong factors. In New York City, 74% of public school students live in poverty [4] with most from groups underrepresented in science [3]. In the two lowest-income districts in Manhattan, Harlem and the Lower East Side, where our work is focused, students significantly lag behind city-wide science proficiency levels. The BioBus mobile science lab has helped unlock the scientific potential of thousands of low-income students and their teachers by giving them the chance to hunt for and record movies of amoebae using research microscopes alongside research scientists. In Spring of 2015, Math for America and BioBus jointly hosted a "Biophysics of Amoebae" mini-course for 20 NYC public school teachers at the BioBase community science lab in the Lower East Side and an additional 40 live stream participants. Here we will discuss the successes and challenges of performing microscopy in a distance learning environment, performing computer-aided image analysis in the K-12 setting, and engaging teachers in primary literature.

2. RESULTS AND DISCUSSIONS

The three, two-hour sessions of the mini-course consisted of experimental microscopy, computer-aided image analysis [7],

and journal club style discussion. In session one, participants worked on phase contrast light microscopes to record movies of amoebae from pond water and then used ImageJ to analyze membrane velocities in the amoebae. Session two opened with Ben Dubin-Thaler describing his Ph.D. research on amoeboid motility [1] followed by a journal club style discussion of primary literature [2]. In session 3, participants created movies of different species of amoeba and then used ImageJ to measure the results of an amoeba "race". Teachers were asked to complete a five question survey after the course ended. 100% of the 4 respondents agreed the course "strengthened content knowledge and/or classroom practice." One teacher stated: "This workshop helped me to understand deeper cell movement. It also modeled to us how to conduct a peer discussion to analyze a primary research paper." Our results suggest courses like this one can inspire public school teachers to bring exciting concepts and methods into the classroom, helping students reach their scientific potential. This extended abstract summarizes an invited presentation delivered at PhysNet 2015.

3. REFERENCES

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