

Project Year

2005

Project Team

Henry Colecraft, Faculty, Johns Hopkins University School of Medicine, and Biomedical Engineering, Whiting School of Engineering; Allyson McCabe, Staff, Center for Educational Resources, MSE Library; Kyle Fritz, Undergraduate Student, Biomedical Engineering, Whiting School of Engineering

Project Title

Conveying Molecular and Cellular Biology Concepts via Flash Animation

Audience

Undergraduate Biomedical Engineering students taking the *Molecules and Cells* course.

Pedagogical Issue

This course covers the interactions between molecules, cells and parts of cells. Students learn how particles bind to each other, undergo conformational changes, and send out signals to other parts of the body. These dynamic concepts are often difficult for students to grasp by looking at the static pictures in the text book. The transition state of particles is often just as important as the final state, and these transition states are not depicted well by fixed pictures.

Solution

The team will design a series of narrated animations using Macromedia Flash that depict the most challenging concepts in the class. The series of animations will allow students to watch molecular interactions take place, rather than jumping from one molecular step to the next. The videos will firmly ingrain in their minds the necessity of each step and the exact order of events. The animations will also be integrated into the course's WebCT site for students to review out of class. The narration will allow animations to appeal to both visual and audible learners.

Technologies Used

Animation, Graphic Design, Macromedia Flash, HTML/Web Design, Courseware (WebCT development), Digital Audio

Project Abstract

The team proposes to design a series of narrated animations using Macromedia Flash that depict the most challenging concepts in the *Molecules and Cells* class. These animations can be used in lecture to pull together broad sections of material and to sum up key concepts. They will include advanced movie controls so that students and faculty will be able to pause, rewind or go through the sequence slowly to dissect the included information. Each animation will be narrated by the Fellow, using language honed by Professor Colecraft to correspond exactly with the language used in lecture. This project is intended to improve the undergraduate learning experience in the Department of Biomedical Engineering's (BME) *Molecules and Cells* course, which is required for all BME sophomores (> 100 students each year). For

most students, this course is their introduction to advanced concepts in cellular and molecular biology. Typically, the material presented in any one lecture introduces a number of new molecular entities that interact in temporally and spatially precise ways to achieve a biological function. Feedback from the students indicates that the complexity of the subject matter often makes it difficult to absorb many concepts during the lecture, and the static nature of the summary slides does not best convey information about systems that are dynamic. To address this issue, we intend to develop a series of interactive, animated summary slides that will better convey the dynamic nature of the material covered in class lectures. Under Professor Colecraft's supervision, Kyle Fritz, the proposed Technology Fellow, would develop a series of summary animations for the lectures. Kyle is a dynamic student who is well-suited to the task because of his skills with Macromedia Flash, and because he was recently a student in the *Molecules and Cells* class. The impact of the animated slides on student learning will be evaluated as part of the pre-existing questionnaire that students fill out at the end of the class.

A video of Henry and Kyle's presentation (time=4:01) is available here:

http://mfile.akamai.com/71111/mov/streams1.nts.jhu.edu/~jhmedia/cer/tfvideos/5_flash_lec.mov

A link to the *Molecules and Cells* animations is available here:

<http://youyiths.com/fakeweb/tf/molcell.html>