

Virginia Commonwealth University's  
Bioinformatics and Bioengineering Summer Institute  
**Summer Research / Curriculum Development for K-12 Teachers**

**Overview**

The program is aimed at teachers who are looking to expand their students' opportunities to learn mathematics and science by creative exploration. An important step in this quest is to increase one's own contact with the process of science, and to this end, participating teachers will be immersed in a culture of research, where they will play a significant role solving scientific puzzles, alongside students and senior researchers similarly engaged. At the same time, teachers and their mentors will develop classroom modules that promote discovery, using a freely available online resource that facilitates the creation of games, projects, and simulations.

A fuller description of the BBSI (of which Research Experiences for Teachers is a part) may be found at the Institute's web site:

**<http://www.vcu.edu/csbc/bbsi>**

**Duration**

The 2010 edition of the BBSI extends from June 1 to August 11. It is understood, however, that this period will probably overlap with a teacher's school commitment, and a great deal of flexibility is possible. However, the program requires that participating teachers have no other work or school commitments during the summer. When you ARE here, we want all of you. That's how research works.

**Activities**

The greater part of participants' time will be spent on their research projects and on curriculum development. However, participants are invited to participate in the full array of Institute activities, designed to introduce students to the joys of the life of research. These include research simulations several mornings each week, devoted to the research projects of each individual participant. The simulations give participants an idea of the kinds of problems they may face and the solutions that may be applied. All participants will present the fruits of their investigations multiple times throughout the summer.

**Eligibility**

Any in-service or pre-service K-12 teacher may apply. We especially encourage applications from pairs of teachers from the same school (for example, one teacher may focus on biology and the other on mathematics). Applicants should have an interest in the teaching of mathematics and science. Applicants must have a commitment to teach in a school Fall 2009.

**Support**

Teachers will be given a stipend of \$8,000 to support their participation.

**Application Process**

Apply online (**<http://www.vcu.edu/csbc/bbsi>** -- click on **Institute**, then **Application Process**, then **Application Form for Teachers**). Applications may be submitted at any time and are being considered now for acceptance into the program.

## Examples of modules that have already been built

The modules listed below can be sampled online by going to  
<http://biobike.csbc.vcu.edu/>  
and clicking Guided Tours of BioBIKE

- 1. What is a gene?** (high school biology)  
Examining from the cell's perspective, through experiments with gene sequences, what in a sequence of DNA signals the beginning and end of a gene.
- 2. Alien Genetic Code** (high school biology)  
Analysis of DNA isolated from organisms found within a crashed flying saucer. Provides students with tools that enable them to do experiments to crack a genetic code.
- 3. How Close is Close Enough?** (high school biology / math)  
Takes students through building a simulation of Mendel's monohybrid crosses, which they can run any number of times to determine how unusual were his actual results. Aimed at eliciting insight into the meaning of uncertainty in experiments and how to think intuitively about statistics.
- 4. Where will the coconut land?** (5<sup>th</sup> grade math)  
A monkey at the top of a tree is chucking coconuts at you. How can you figure out where they're likely to land (and where you might sit) after they bounce off some number of branches? Aimed at eliciting insight into probability and Pascal's triangle.
- 5. Modeling the spread of malaria** (2<sup>nd</sup> grade)  
Presents students with a highly visual model of the spread of malaria through which they can explore what variables affect the number of people infected. Is it better to go for treatment or prevention?