Cornell’s Learning Initiative in Medicine and Biomedical Engineering (CLIMB)
NSF funded Graduate Fellows in K-12 Education Program
2010 Teacher Resident Scientist Application Form

Program Overview

The Cornell Biomedical Engineering GK-12 partnership program offers teachers the following:

- Stipend: $3,850
- Earn 3 credits from Cornell (BME will pay for the course)
- Develop curriculum/lesson plans with Cornell BME graduate student fellow during the 2010-2011 academic year.

The major theme that BME –GK-12 will emphasize is biomedical engineering, providing medical and health-related science topics. In this program, middle and high school teachers will be paired with a Cornell graduate student for a six-week summer program that begins the first week of July. The graduate student will serve as a mentor for the teacher in a small research project conducted in the faculty thesis advisor's lab. In addition, the graduate student, teacher, and thesis advisor will work together to devise new, inquiry-based methods for teaching science ideas and approaches to middle and high school students (a workshop on inquiry-based learning will be held at the start of the summer program). During the following academic year, the graduate student will spend about 4 days per month working with the teacher in the classroom to implement these new approaches as well as helping with other science teaching. The effectiveness of the new teaching methods will be evaluated through classroom studies. One goal is to submit a co-authored manuscript to an education journal on the new teaching ideas and the results of the study of their effectiveness.

Duration of Program: The BME GK-12 program is a two-part program. Starting in the 2010 summer and continuing into Fall 2010-Spring 2011.

Part I: Summer: July 6 – August 13, 2010 teachers will:

1. Earn 3 credits through participation in course BME 5875: Frontiers in Biomedical Research for Teachers. The goal of BME 5875 is to help middle and high school science teachers increase their knowledge in key topics of relevance for biomedical science and for them to gain a sense of how new scientific knowledge is generated. This new knowledge and understanding of science topics and the process of science will then enable these teachers to provide better classroom instruction to their students.

2. Develop curriculum/lesson plans with Cornell BME graduate fellow.

Part II: Fall 2010 – Spring 2011 each teacher and graduate student team will implement curriculum/lesson plans in their classroom.

Brief Outline of the Summer 6-week Course:

Course Directors: Prof. Chris B. Schaffer and Dr. Shivaun Archer

Classroom work: Readings, lectures, and discussions will provide science knowledge in a variety of topics over the six-week summer program. The topics covered in BME 5875 will focus on issues related to human health, allowing teachers to bring a real-world relevance to their classroom discussions and to show students how the science they are learning connects to the treatment of disease. Topics will also be interdisciplinary, providing a link between the traditional courses in physics, chemistry, and biology that are taught in middle and high school. The level will be high enough to provide a solid understanding of the relevant science concepts, but will also aim to link to ideas taught in middle and high school science classes. Possible examples include: chemical release kinetics for design of drug delivery devices; optical principles for monitoring of tissue oxygenation; high resolution microscopy to image cancer cells; and mechanical properties of gels for the engineering of replacement tissues. There will be weekly web-based quizzes related to the classroom portion of the course.

Research project: One of the main goals of this course is to help teachers gain a first-hand appreciation of how new science knowledge is generated in the lab. Teachers will work with their partnered graduate fellow partner and a BME faculty member on a research project and report on their results to each other and to BME faculty and students. By actively participating in scientific research, teachers will learn more about the ways new scientific ideas are created as well as gain additional expertise in a particular area of biomedical science. This experience will give the teachers a “story” they can take back to their classroom to help students understand what scientists do and how new scientific ideas arise. The research topic will vary depending on the lab, but will generally be focused on basic science and engineering that is related to human health problems. The work on this research project will be the bulk of the teacher’s activities in this course. There will be two assignments related to the project. In the second week, teachers are asked to give a short talk (about 5 minutes) that outlines the motivation, specific goals, approach, and potential impact of their research project. In the final week, the teachers will present a poster on their research project to their fellow students, as well as BME faculty and graduate students.
Teacher Information Sheet

Applicant’s Name:  Last_____________________________________, First_______________________________________

Home Address:  _____________________________________________________________________________________________
City:  ____________________________________________________ State:  _________________  Zip Code:  _________________

Phone: (        ) _________________________  Email:  _______________________________________________________________

School/Institution:  ___________________________________________________________________________________________

Current Position/Title:  ________________________________________________________________________________________

Area of Certification:  _________________________________________________________________________________________

Courses Taught:  Name of Course  Grade Level
2008-2009  ________________________________________________________________________________________________

________________________________________________________________________________________________

2009-2010  ________________________________________________________________________________________________

(Expected)  ________________________________________________________________________________________________

☐ Please attach a résumé which includes your education, science positions held (both teaching and other.) and any other information you feel is pertinent.

Completion of the enclosed information is voluntary. This information is used by the National Science Foundation (NSF) to determine how well the program serves all segments of the diverse population; it does not affect your application.

Gender:  □ Male  □ Female
Race/Ethnicity:  □ African American  □ Asian/Pacific Islander  □ Caucasian
(Other (specify):  _______________________

☐ Please send completed application packet postmarked by Feb. 26, 2010 to:
Nev Singhota
BME GK-12 Program
Cornell University
101 Weill Hall
Ithaca, NY 14853
Tel: 607-255-1486  Fax: 607-255-3957
E-mail: nks5@cornell.edu

THE INFORMATION IN MY APPLICATION IS ACCURATE TO THE BEST OF MY KNOWLEDGE.
Signature of Applicant  ____________________________________________________  Date  ______________________________

Application Checklist:
☐ Teacher Information Sheet
☐ Résumé
☐ School Information Sheet
☐ Essay Statements
☐ Principal/Superintendent Letter supporting collaboration with GK-12 BME graduate student fellows.
School Information Sheet

School Name:  

School District:  

School Address:  

City:  ___________________________ State:  ____________ Zip Code:  ______________

School Phone:  (       ) ___________________________ School Fax:  (       ) ___________________________

Principal’s Name:  

Principal’s Phone:  (       ) ___________________________ Principal’s email:  

Please check all items applicable to your school:

Affiliation:  

□ Public  □ Charter  □ Magnet  □ Private
□ Independent  □ Parochial  □ Proprietary

Location:  

□ Urban  □ Suburban  □ Rural

Sex:  

□ Coed  □ Boys only  □ Girls only

Type:  

□ Vocational School  □ High School  □ Middle School  □ Primary School  □ Central School  □ Other (specify):  ____________

Grade Levels:  

□ Kindergarten  □ 1st  □ 2nd  □ 3rd  □ 4th  □ 5th  □ 6th  □ 7th  □ 8th  □ 9th  □ 10th  □ 11th  □ 12th  □ Post 12

Please approximate the following information to the best of your knowledge.

Student enrollment:

Total   ________

Enrollment by sex:

Male:   ________

Female:   ________

Enrollment by race/ethnicity:

African American:   ________

Asian/Pacific Islander:   ________

Caucasian:   ________

Latino/Hispanic:   ________

Native American:   ________

Other   ________

Number of students eligible for school lunch program:   ________

Percentage of students going on to college or other higher degree:   ________
Please answer the following questions in fewer than 500 words. This may be written on a separate sheet of paper.

• Why do you want to participate in the GK-12 program?
• What do you hope your students will gain by working with a GK-12 fellow in your classroom?
• Describe how science instruction looks when it is effective and what barriers and challenges impede it?

Please include Principal/Superintendent Letter supporting collaboration with GK-12 BME graduate student fellows.