Session AF: Reforming the Introductory Physics Course for Life Science Majors VIII

Location: Bucktown II
Sponsor: Committee on Physics in Undergraduate Education
Date: Monday, January 7
Time: 8:30-10 a.m.
Presider: Juan Burciaga

AF01: 8-8:20 a.m. Physics of Medicine (POM)
Invited – Nancy L. Donaldson, Rockhurst University, Kansas City, MO 64110; nancy.donaldson@rockhurst.edu
Mary Lowe, Loyola Maryland University
In 2009, Rockhurst University established a Physics of Medicine Program designed to deepen students’ understanding of physics as it is applied to medicine. Through a focus designed to build upon introductory physics principles to an application of physics in medicine, Rockhurst’s POM Program has been successful in attracting students from different disciplines into upper-division physics courses. In POM, students study the physics principles involved in analyzing human physiological and anatomical function, the detection/diagnosis of disease and the subsequent treatment plan. Active-learning includes a mixture of hands-on work, experimentation, research and project design, lectures, problem solving, guest speakers from the medical community and field trips to view medical imaging equipment and nuclear medicine facilities. Rockhurst University and Loyola Maryland University received a collaborative NSF TUES grant in May 2012 to develop three upper-division active learning modules in fiber optics in medicine, pressure in the human body and nuclear medicine.

AF02: 8:20-8:40 a.m. How Can Biologists Learn to Love Physics?
Invited – Jay Nadeau,* McGill University, Montreal, QC H3A2B4 Canada; jay.nadeau@mcgill.ca
Many biologists see introductory physics as a “weed-out” class to be endured, and do not make the connection between the fundamental principles of physics and many common biological problems and techniques. At the same time, these evolving quantitative techniques make it more and more necessary for biologists to have a firm grasp of physical principles and of quantitative methods such as dimensional analysis and statistics. One of the biggest conceptual hurdles occurs during the introduction of electromagnetism (E&M) and wave optics. Students who have readily mastered elementary mechanics are often overwhelmed by the abstract and “invisible” nature of E&M. This situation is not aided by engineering-specific test questions that appear to have little to do with biology. In my talk, I present some basic biological systems that can be used to illustrate principles of optics and E&M in a rigorous way.

*Sponsor: Juan Burciaga

Session AG: History and Strengthening of Physics Departments at HBCUs

Location: Bolden
Sponsor: Committee on Minorities in Physics
Co-Sponsor: Committee on History and Philosophy in Physics
Date: Monday, January 7
Time: 8-10 a.m.
Presiders: Ntungwa Maasha and James Lincoln

AG01: 8-8:30 a.m. Targeted Infusion and Enhancement of the Physics Program at Howard University
Invited – Prabhakar Misra, Howard University, Department of Physics & Astronomy, Washington, DC 20059; pmsra@howard.edu
The presentation will provide an overview of the programs and innovations currently under way to increase student retention and enrollment in the Department of Physics & Astronomy at Howard University. The targeted infusion effort involves upgrading of instructional facilities, offering peer student stipends for tutorial programs, and making available student-centered recruitment scholarships. The expected outcome will be better-prepared students completing courses in a timely manner and an enhanced learning experience within the department. Such targeted initiatives will help address both retention and enrollment of physics majors and also help expand the department’s outreach efforts.