

# ***Physics Colloquium Series***

## ***Student Talks***

### ***"How Accurate is Newton's Law of Gravitation?"***

*Newton's gravitational force law was an integral part of the modern science revolution. However, certain assumptions were made when he was building the theory. Today we realize that planets are not rigid spheres, gravity is a multi-bodied -- not a two-bodied -- problem, and macroscale physical systems do not operate in ideal ways. In theory, the famous equation  $F_g = \frac{GMm}{r^2}$  is a beautiful example of a simple yet powerful expression. In practice, the equation is not exact and takes the form  $F_g = \frac{GMm}{r^{2+\epsilon}}$  where  $\epsilon$  is a very small correction. I have calculated this correction using computational techniques to see just how close Newton was to describing our contemporary observed universe.*

**Christopher Parmelee**

---

### ***"Closing the Loop"***

*Control theory and robotics is a very fruitful field of science. Computers are aiding this field greatly by allowing control theorists to implement complex control theory logic. However, most computers are low power devices. A typical computer is not capable of driving a motor; it can not supply that kind of power. An amplifier is needed to bridge the computer to its motors. This is the system which I am helping to create. My Senior Project group is attempting to bridge the Sensoray 626 Data Acquisition card to 4 motor drive channels capable of driving either DC or Stepper motors. By sending feedback signals to the Sensoray card, this system will be giving the computer all the information it needs to run in closed loop. With the modeling power of a computer, the capability to control motor torques, and the machinery to translate feedback signals from the motor and other robot sensors, students in robotics at CSUS will finally be able to implement their control logic on a computer and have it run a real robot.*

**Jonathan Foster**

---

### ***"Confronting Depression"***

*Student life is never easy. On top of handling the work load of classes, part time jobs and funky roommates, students also experience emotional difficulties. By mid-terms and finals, many students feel depressed and hopeless. Even the brightest minds in the physics world were not spared from depression. If left untreated, depression can lead to suicide. I will show you how to identify depression by learning its symptoms, and be prepared to deal with suicidal behavior by recognizing the warning signs. Student depression may be unavoidable, but its consequences don't have to be. I invite you to break the silence on this topic and discuss it openly. There are solutions. There is hope.*

**Brigitte Ciobanu**

---

**Thursday, December 14, 2006**

**4:00-5:20 PM MND 1015**

**OPEN & FREE TO ALL STUDENTS, FACULTY & PUBLIC**