

## **CSU ECE Department Seminar Series – Spring 2007**

[Please also see ECE Seminar Series web page at <http://www.engr.colostate.edu/ece/seminars.shtml> for other seminars scheduled for this semester.]

The Department of Electrical and Computer Engineering at Colorado State University is pleased to present a seminar by

**Diego Krapf, Postdoctoral Fellow, Delft University of Technology**

**Title: “Solid-State Nanopores as Single Molecule Sensors”**

**Tuesday, March 6, from 4:00 – 5:00 p.m., LSC 214-6**

**Abstract:** Nanopores are single nanometer-sized holes in thin insulating membranes, which present a new tool for the detection and analysis of individual biopolymers such as DNA. Applying a voltage bias, negatively charged DNA molecules are pulled through the pore by the electric field. When a molecule enters the channel, it displaces its own volume of solution and hence it alters the pore ionic conductance. By recording the ionic current it is possible to detect the passage of individual molecules.

Recently we started an effort to combine solid-state nanopores with optical tweezers to study real-time dynamics of DNA and protein-DNA interactions. Individual DNA molecules can be electrically driven into a nanopore while holding one end of the DNA with the optical tweezers. As a result, the DNA translocation is stalled at a specific site and its position is controlled with nanometer accuracy. The capture of DNA inside the pore is detected as changes in both the ionic conductance and the bead position (force detection). We have demonstrated the capabilities of this technique by locally measuring the electric force exerted on a DNA molecule during translocation through a 10-nm pore. These measurements allow us to gain insight into the microscopic structure of the ionic atmosphere surrounding DNA polymers. I will also present current experimental research being pursued to understand polymerization kinetics of DNA binding proteins.

Refreshments will be served.

Please contact Prof. Branislav Notaros, [notaros@colostate.edu](mailto:notaros@colostate.edu), with any questions.