

# SE&T Colloquium Series-Winter 2013

Speaker	Dr. Ozlem Defterli Department of Mathematics and Computer Science Cankaya University, Turkey Host: Dr. Al Freed
Title	<b><i>Introduction to Modeling and Inference of the Dynamics of Genetic Regulatory Systems</i></b>
Abstract	<p>The analysis of time-series gene expression data, which are obtained from DNA-microarray chip experiments, is a challenging problem in the areas of life and environmental sciences, computational biology and engineering sciences. According to these obtained experimental data and the data coming from environmental measurements, the interactions of each gene with the others in a metabolic and genetic structure have to be identified and the influences need to be predicted. In such a genetic network, expressing clearly the connections is a research problem of mathematical modeling that leads to non-convex optimization problems.</p> <p>In this talk, the basic notions about genetic regulatory networks and microarray experiments will be introduced together with the various modeling aspects studied in the literature in order to describe and predict the behavior of such complex systems. Among the different network models, the dynamic modeling based on a class of time-continuous systems of ordinary differential equations will be stressed. Moreover, their time-discrete versions will also be presented with the corresponding matrix algebras. The problem of parameter estimation in the considered model class will be defined as a non-convex optimization problem. Finally, the inference and prediction of the future behavior of such complex systems will be done by the solution of the optimization problem and existence of the numerical schemes applied on an illustrative example.</p>
Date	Tuesday, March 26
Time	4:10-5:00pm
Place	Pioneer 240
	Refreshments will be served at 4:00pm.