

Department of Mathematics & Statistics

Honors Week 2017

Friday 28 April

4:00 AMB 164

INTERDISCIPLINARY TALK:

Modern mathematics in cancer studies:
The need for small data analysis

Epidemiology is the study and analysis of the patterns, causes, and effects of health and disease conditions in defined populations. It is the cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare. A crucial component of any epidemiological study is the development of appropriate methodology for successful design, collection and statistical analysis of public health data. In this talk we focus on cancer studies. Unlike the general trend in the larger scientific community, data collected in these studies do not generally fit the big data paradigm. Rather, clinical studies tend to produce small data sets that seldom fit the hypothesis of traditional asymptotical statistical analysis.

Interactions between single nucleotide polymorphisms (SNPs) and complex diseases have been an important topic throughout epidemiological studies. Previous studies have mostly focused on gene variables at a single locus. In this talk, we discuss a focused candidate gene study to test the interaction among sets of SNPs and the risk of different types of cancer. We will present the general challenges in this area and we will introduce new statistical methodologies based and modern mathematics to address the small data challenge. We will focus on a gene-gene interaction on cancer data obtained from the European case-control study Gen-Air.



Dr. Luis David García Puente

is Associate Professor of Mathematics at Sam Houston State University. His research focuses on computational and applied algebraic geometry. He has directed research projects for 15 years, involving close to 100 undergraduate students in his work.