Research In Progress Seminar

Tuesday, May 23, 2017
3:30PM

Location: CCBS Conference Room, 2622 Biological Sciences 3

Speaker:
Luis Martinez Lomeli,
MCSB PhD Program
(Babak Shahbaba Lab)

Talk Title:
Bayesian Uncertainty Quantification of a tumor evolution model

Abstract:
Bayesian Uncertainty Quantification for differential equations has become a very active area of research in recent years. We apply this methodology to a mechanistic delay differential equation of the evolution of a non-small cell lung cancer. This model explains the evolution of the tumor in patients after starting a combined chemo and radiotherapy treatment. We assume that the tumor subpopulations are latent, and we only observe the total tumor volume size under the additive Gaussian noise. We use a combination of informative and weakly-informative priors to incorporate our domain knowledge based on previous studies. Given the observed data, we have been able to provide posterior distributions for all model parameters to quantify uncertainty. We also propose a method to incorporate patient variability as a random effect. In principle, this can allow us to design patient specific treatment procedures.

Questions:
Please contact Naomi Carreon at: ncarreon@uci.edu or Kerrigan Blake at: kerrigab@uci.edu