Epi-on-the-Island

Bayesian Latent Class Modelling in Animal Health

June 8 (noon) – June 11 (noon), 2016

Tentative Schedule

Day	Time	Session	
Wed. PM June 8	**13:00 – 18:00**	**Session I**	**Introduction to Probability, Bayes Theorem and Elementary Diagnostic Testing**
	13:00 – 14:30		**Lecture 1:** Introduction to basic probability and its properties, illustrated in the context of diagnostic testing.
	14:30 – 15:00	Break	
	15:00 – 16:30		**Lecture 2 & Lab 1:** Discrete, Bernoulli, binomial, multinomial, and continuous, normal, beta distributions. Likelihood function, Maximum Likelihood estimation. Hands-on with Sliders
	16:45 – 18:00		**Lecture 3 & Lab 2:** Bayes Theorems. Specification of a beta prior distribution for prevalence, Se, Sp using Beta-Buster/Beta-slider. Posterior inference for prevalence. Hands-on with Beta-Buster/Slider.
Thur. AM June 9	**08:30 – 12:00**	**Session II**	**MCMC Approximations; Application to One Sample Imperfect Test Outcome Data**
	08:30 – 09:30		**Lecture 1:** Bayesian Philosophy, Concepts and Ideas
	09:30 – 10:30		**Lecture 2:** Introduction to Monte Carlo simulation using BUGS to approximate posterior densities and their characteristics, e.g. mean, median, 95% probability intervals etc.
	10:30 – 10:45	Break	
	10:45 – 11:30		**Lecture 3:** Application to one-sample no-reference-standard diagnostic outcome data, testing for Nucleospora salmonis. Bayesian inferences for sensitivity, specificity, prevalence, PVP and PVN
	11:30 – 12:00		**Lab 1:** Hands-on exercises using Beta-Buster/Slider and OpenBugs as tools for illustrating the application of Bayesian methods to one sample diagnostic testing problems.
	12:00 – 13:00	Lunch	
Thur. PM June 9	**13:00 – 18:00**	**Session III**	**Two Conditionally Independent Tests; Introduction to Bayesian Logistic Regression Modeling**
	13:00 – 14:30		**Lecture 1:** Diagnostic testing based on multiple conditionally independent binary tests.
	14:30 – 15:00	Break	
	15:00 – 15:30		**Lab 1:** Hands-on using Bugs
	15:30 – 17:00		**Lecture 2:** Introduction to Bayesian logistic regression modelling; analysis of space shuttle data and trauma data
	17:00 – 17:15	Break	
	17:15 – 18:00		**Lab 2:** Hands-on using Bugs

Day	Time	Session	
Fri. AM June 10	**09:00 – 12:15**	**Session IV**	**Mixed LR Modeling, LR with Error in Response**
	09:00 – 10:30		**Lecture 1:** Mixed model logistic regression. Analysis of cow abortion data.
	10:30 – 11:00	Break	
	11:00 – 11:30		**Lab 1:** Hands-on analysis of cow abortion data.
	11:30 – 12:15		**Lecture 2 & Lab 2:** Logistic regression with error in response. Hands on analysis of smoking cessation data.
	12:15 – 13:15	Lunch	
Fri. PM June 10	**13:15 – 17:30**	**Session V**	**Dependent Tests and Combined Independent and Dependent Tests**
	13:15 – 14:45		**Lecture 1:** Diagnostic testing based on two conditionally dependent binary tests in the absence of a gold standard.
	14:45 – 15:00	Break	
	15:00 – 15:45		**Lab 1:** Hands-on OpenBugs session, testing for Neospora caninum and Toxoplasmosis.
	15:45 – 16:30		**Lecture 2:** Three tests; two dependent and one conditionally independent of the other two; analysis of Toxoplasmosis data.
	16:30 – 16:45	Break	
	16:45 – 17:30		**Lab 2:** Hands on testing for Swine Fever Virus.
	18:30 –	Course Dinner	
Sat. AM June 11	**08:30 – 12:00**	**Session VI**	**Prevalence Estimation**
	08:30 – 10:00		**Lecture 1:** Hierarchical (multilevel) prevalence modeling and estimation
	10:00 – 10:30	Break	
	10:30 – 11:00		**Lab 1:** Hands on prevalence estimation with Johnes Disease data
	11:30 – 12:00		Course wrap-up