# PHRM 580: Topics in Pharmacogenomics 2019

**Course Director: Alexander Steven Whitehead, DPhil; Department of Systems Pharmacology and Translational Therapeutics**

<u>**11am-1pm, Fridays BRB 1101**</u>

This is a "literature-based" course (i.e. a seminar course/literature survey). It will survey the emerging technologies and computational advances that have permitted the field of Pharmacogenomics to mature into a major biomedical discipline over the past few years. It will consider the likely impact on disease target identification; the development of new drugs for established and "niche" markets; the advent of "personalized medicine" including the selection of therapies that have maximum efficacy and minimum side-effect profiles. This course will also touch on some of the ethical issues associated with the routine genetic testing of patients to facilitate treatment choices and clinical monitoring.

Proposed Sessions:

Each session will last for two hours (between 11am and 1pm on Friday mornings) and will be moderated by a faculty member. Most sessions will consider key original papers, reviews and, on occasion, articles from the popular press. In some sessions the students participating in the course will make presentations of the relevant material that are followed by group discussion. Some (but not all) sessions will require the faculty member to make a short "mini-lecture" to introduce the broad aspects of the topic under consideration. Students will be evaluated based on both participation in discussion (including presentation) and two essays: one dealing with one of the course topics other than one that they have been responsible for presenting to their peers, and one dealing with a relevant topic of the student's choice (with approval of the course director). Evaluation will be based on these essays and the student's contributions towards class discussions (and presentations).

The course director will make every effort to attend each session.

Jan 18th - Course overview and introduction to pharmacogenomics. (Steve Whitehead, D.Phil.)

Jan 25th - Modern methods for high throughput genotyping – essential tools for supporting large-scale pharmacogenomic studies. (Struan Grant, Ph.D.)

Feb 1st - Transcriptomics: gene expression profiling as a tool for the discovery of pathogenic pathways, and candidate genes for disease association and pharmacogenomic studies. (Greg Grant, Ph.D.)

Feb 8th - The use of proteomics in genetic and pharmacogenomic studies (Ian Blair, Ph.D.)

Feb 15th - Single cell expression profiling for the context-dependent investigation of normal and dysfunctional biological processes. (James Eberwine, Ph.D.)

Feb 22nd - Biostatistical approaches to the analysis of genotype and phenotype data in pharmacogenomic studies and clinical trials. (Sean Hennessey, Pharm.D., Ph.D.)

March 1$^{st}$ - Ethical issues posed by the application of pharmacogenomics. (Jon Merz, Ph.D.)

March 8$^{th}$ - Spring break so no class

March 15$^{th}$ - Genetic factors influencing the maintenance of patients on Warfarin therapy within an acceptable therapeutic window of coagulation. (Stephen Kimmel, M.D.)

March 22$^{nd}$ - Online tools for pharmacogenomics (Caroline Thorn, Ph.D.)

March 29$^{th}$ - Application of online tools to irinotecan and clopidogrel pharmacogenomics (Caroline Thorn, Ph.D.)

April 5$^{th}$ - Thiopurine S-methyltransferase deficiency and life-threatening azathioprine and 6-mercaptopurine toxicity. (Whitehead)

April 12$^{th}$ - Dihydropyrimidine dehydrogenase deficiency and its impact on cancer chemotherapy using fluorinated pyrimidines (Whitehead).

April 19$^{th}$ - Polymorphism in the folate/homocysteine metabolic pathway: predictors of drug efficacy, drug toxicity and elevated risk of co-morbidity, Part I (Whitehead)

April 26$^{th}$ - Polymorphism in the folate/homocysteine metabolic pathway: predictors of drug efficacy, drug toxicity and elevated risk of co-morbidity, Part II (Whitehead)

May 3$^{rd}$ - Open session (Whitehead)