

## **Advanced Research Skills in Pharmacology: A new module for an MSci in Pharmacology to train a new generation of scientists**

**Background and Aims:** Undergraduate students often leave University with very few laboratory skills. Our aim was to design a new 4<sup>th</sup> Year undergraduate module that would provide students with a range of skills that would prepare them better for a PhD or a career in pharmacology, in biotech or a Pharmaceutical company. We will also seek to help students acquire the confidence to tackle new problems independently or in teams without staff support. A special focus will be given to developing advanced problem-solving skills that would be relevant inside or outside of science. Students will be trained to make best use of on-line resources for problem solving across a wide range of domains that will equip them for a career in science and a life in the real world.

**New module structure:** The 30-credit "Advanced Research Skills in Pharmacology" module will run for the first time from September to December 2015. The module consists of a series of six practicals over the domains of Neuropharmacology, Cardiovascular Pharmacology and Inflammation run by staff members (from Lecturer to Professor) who are active in research. Summative assessment of the module is entirely in-course with students writing up one practical experiment from each domain. Formative assessment is provided by giving feedback on the write-up of an additional practical conducted early in the module. Students will have the opportunity to handle mice and quantify locomotor behaviour, learn basic cell culture skills, do calcium imaging experiments using primary neurons, measure migration of inflammatory cells, assess neutrophil responses to inflammatory stimuli, visualise human and animal hearts using ultrasound, perform experiments using in vitro organ bath preparations and observe cardiovascular telemetry experiments in rodents. Students also work in groups to design an experiment using cutting-edge transgenic mice (Cre/Lox/tamoxifen) to control gene deletion with temporal and spatial control. Students will perform experiments in a variety of research settings including dedicated undergraduate labs as well as active research laboratories across three campuses.

**Novel e-learning tools:** Weekly webinars will allow students to teach themselves to use SigmaPlot. We have developed a large set of short YouTube videos which show students how to use SigmaPlot. Students will also learn how to draw publication-quality graphs and to analyse data of various types using methods ranging from t-tests to two way repeated measures ANOVA, nonparametric tests, and Chi-squared tests. Students will assess their own progress by answering Multiple Choice Questions several times each week. Students can pose questions about statistics to a staff member at weekly Google Hangout videoconferences where they can view data analysis being carried out live on SigmaPlot.

**Career skills:** Students will be given advice on effective strategies for seeking PhD positions or obtaining job interviews. A workshop will be provided whereby they can improve their CVs. We will coach students on how to give an excellent lab talk and will provide video feedback so students can evaluate their own performances to help them prepare for laboratory life.

**Conclusion:** The first set of students begins this module in September. We will gather feedback from this group weekly using anonymised on-line forms so that the course can be improved from week to week and from year to year. We will collate the feedback and present these results at the meeting.