

Division of Medical Sciences

Ph.D. Programs at Harvard Medical School

Nanocourses
Fall Semester
2013 - 2014

Full listings available at:

<https://nanosandothercourses.hms.harvard.edu/>

For information call: 617-432-0162

Division of Medical Sciences (DMS) Nanocourse Policy

Read below to learn how to receive course credit and register for a nanocourse:

Course Credit:

Although students are encouraged to take as many nanocourses as they please, official credit will be granted for up to six nanocourses only. Students must participate in all sessions of a nanocourse and complete all the assignments in order to qualify for credit. Completion of three nanocourses will be equivalent to a quarter course credit.

Course Registration:

Nanocourse enrollment is required only for students who wish to accrue credit. Students are required to enroll on the web site in advance of the course (as specified per course on the web site). Students may drop a course using the web site, up to one week prior to the first session of the course. Failure to attend or complete the course will result in an incomplete grade for students who do not drop the course one week before the course date. An incomplete grade will also be given to students who do not attend both days of a nanocourse for which they have enrolled if they do not drop the course as specified above.

Intellectual Unit:

Public Health 101

Nanocourse Director(s): David Van Vactor

Curriculum Fellow: Zofia Gajdos

Lecturers:

Graduate students and postdocs at HSPH and elsewhere at Harvard have had limited opportunities outside of traditional coursework to gain a basic understanding of the multidisciplinary areas of study within public health and the roles they each play in improving health. To provide a succinct overview and introduction to the field of public health, we have developed the “Public Health 101” nanocourse. The nanocourse will give an overview of the five core areas of public health (epidemiology, biostatistics, social and behavioral sciences, environmental health, and health services administration). Attendees will learn about various epidemiologic study designs (epidemiology and biostatistics), health behavior intervention research (social and behavioral sciences), and the built environment and health (environmental health). In the second session, attendees will use a case-based approach to integrate the skills and knowledge gained in the first session in the context of an exercise related to public policy (health services administration).

Registration is not required to attend session 1, but we are trying to get a sense of who our audience is in order to estimate attendance and appropriately target the level of the presentations. If you're interested in attending session 1, please fill out our informal pre-course survey here: <https://docs.google.com/forms/d/1L-h1Vig3GOhAUVvKQxkdvjFSyAEZ4oZ71Pft0ejKa3Q/viewform>.

(Please note: if you are unfamiliar with the nanocourse format, please see this page for more information about registration and credit.)

Nanocourse Faculty: Dr. Alberto Caban-Martinez, Dr. Myriam Afeiche, Dr. Catherine Kreatsoulas, Dr. Candace Nelson, and Dr. Morteza Asgarzadeh

Course Design Committee: Dr. Alberto Caban-Martinez, Dr. Zofia Gajdos, Dr. Usheer Kanjee, and Dr. Cherie Ramirez

First Session: Thursday, October 3, 2013, 1-4:30 PM

Location: HSPH Kresge Building, Room G3

Second Session: Thursday, October 10, 2013, 1-4:30 PM

Location: HSPH Building 1, Room 1302

Intellectual Unit:

Fundamentals of Data Analysis for Experimental Biologists (OR Statistics for Terrified Biologists)

Nanocourse Director(s): David Van Vactor

Curriculum Fellow: Abha Ahuja

Lecturers:

ENROLLMENT FOR THIS COURSE IS LIMITED AND ATTENDANCE AT BOTH SESSIONS IS REQUIRED. PLEASE ENROLL EVEN IF YOU ARE AUDITING (POST-DOCS, FACULTY, STAFF). PRIORITY WILL BE GIVEN TO STUDENTS ALSO ENROLLED IN THE TECHNOLOGIES FOR DATA ANALYSIS NANOCOURSE.

Biological research is becoming increasingly quantitative. Several user-friendly statistical programs have made it easy to apply advanced analytic methods. However some basic background is needed in order to fully harness the power of these packages. This nanocourse is designed to teach basic statistical concepts and theory in the context of real biological data and results analysis. This course will help students to:

- Analyze their data

- Interpret and understand the output from any statistical package or primary literature

- Communicate their results accurately and effectively

- Prepare for more advanced courses in statistics

Lectures will be interspersed with in-class exercises. The lecturer will teach each topic using real biological data. Students will explore each topic by conducting simple calculations using a calculator. At the end of each topic students will discuss a thought question or solve a problem in pairs or small groups.

Topics Covered:

- Describing your data and summary statistics

- Parametric vs. Non-Parametric Methods

- Making inferences using confidence intervals

- Making inference using statistical tests: t-test, Wilcoxon rank sum, and Correlation and Regression

- Use and abuse of p values

Assignment: All students are required to complete a pre- and post- course survey and attend both days. In addition, students will complete two take home assignments, one at the end of each session. They can do these assignments using a calculator, excel or their favorite statistical software.

DROP DEADLINE: Thursday, October 10, 2013

First Session: Thursday, October 17, 2013, 10 AM - 1 PM

Location: TMEC, 448

Second Session: Thursday, October 24, 2013, 10 AM - 1 PM

Location: TMEC, 334

Intellectual Unit:

Technologies for Data Analysis for Experimental Biologists

Nanocourse Director(s): David Van Vactor

Curriculum Fellow: Melanie Stefan

Lecturers:

ATTENDANCE AT BOTH SESSIONS IS REQUIRED FOR THE NANOCOURSE. PLEASE ENROLL EVEN IF YOU ARE AUDITING (POST-DOCS, FACULTY, STAFF). PRIORITY WILL BE GIVEN TO STUDENTS ALSO ENROLLED IN THE FUNDAMENTALS FOR DATA ANALYSIS NANOCOURSE.

This course is designed to be taken in conjunction with the "Fundamentals of Data Analysis for Experimental Biologists" Nanocourse, but can also be taken as a standalone course. This course will teach students to use the JMP statistical software, which is available to everybody in the Harvard community. This will enable students to

- Implement the concepts learned in the "Fundamentals of Data Analysis"

nanocourse (e.g. summary statistics, parametric and nonparametric testing, correlations)

- Use the software to illustrate some of the concepts and improve statistical intuition (e.g. on p values, confidence intervals and sample

distribution)

- Learn the basics of JMP and be able to use it to analyse their own research data in the future

The focus of this course will be on exercises, both in class and at home. Students should bring their laptops with JMP installed (information on how to do this will be provided in advance). Everyone (including auditors) is required to sign up and attend both sessions.

Students enrolled for the "Fundamentals of Data Analysis" nanocourse will be given priority.

Assignments:

Students will be given an assignment to complete before Day 1 (which consists of installing JMP and going through an entry-level tutorial). There will also be two take-home assignments, one after each day of class.

DROP DEADLINE: Friday, October 11, 2013

First Session: Friday, October 18, 2013, 10 AM – 1 PM

Location: TMEC 448

Second Session: Friday, October 25, 2013, 10 AM – 1 PM
Location: TMEC 334

Intellectual Unit:

HEART MUSCLE REGENERATION

Nanocourse Director(s): Caroline Burns, Ibrahim Domian

Curriculum Fellow: Abha Ahuja

Lecturers:

Heart disease, one of the most important public health problems worldwide, is directly related to the inadequate regenerative activity in human hearts. This course will provide a broad overview of important advances that were made in the cardiac regeneration field by using different approaches and model organisms. We will begin by discussing the significance of heart disease and the challenges of developing regenerative therapies. We will present advances into understanding the molecular and cellular mechanisms of myocardial regeneration using a regenerating model organism (zebrafish) as well as poorly regenerating model organisms (mouse, rat, humans). Finally, we will present an overview of translational and clinical research efforts using cell transplantation as an approach to boost the regenerative activity in mammalian hearts.

First Session: Wednesday, November 6, 2013, 1 - 4 PM

Location: TMEC Building, Walter Amphitheater

Second Session: Wednesday, November 13, 2013, 1 - 4 PM

Location: TMEC Building, Room 448

Intellectual Unit:

Next Generation Sequencing Technologies: Principles and Applications

Nanocourse Director(s): Fred Winston

Curriculum Fellow: Emily Gleason

Lecturers: Chad Nusbaum, Peter Park, Robert Steen

Traditional capillary sequencing technology using base-specific chain termination by fluorescent di-deoxy nucleotides represents modifications to the original sequencing methodology devised by Sanger and colleagues in the 1970s. Recent years have seen the development of next generation parallel sequencing technologies that are rapidly replacing older methodologies. Sequencing by synthesis enables the simultaneous sequence analysis of millions of DNA templates at the same time, or in parallel. These new approaches allow for DNA sequencing at a markedly faster pace, and often at a much cheaper price, making sequencing projects feasible for an ever-expanding number of researchers. This nanocourse will explore the methodology and principles behind parallel sequencing technology, and how it measures up to traditional sequencing methods. A discussion of the services available at the Department of Genetics Biopolymers core facility, including order placement, data output, and turnaround times, will also be included for researchers interested in utilizing these resources.

Assignment

Registered students should prepare a one-page document detailing a research question that could be at least partially answered by next-generation sequencing methods, and how you would propose to use them. Please send your documents (either Word files or pdf files) to Emily Gleason (Emily_Gleason@hms.harvard.edu) by 5:00 p.m. on Tuesday, December 10th. Your proposals will be sent to the course lecturers prior to the session so they can look them over and prepare to discuss them with you. Please bring a copy of your proposal to the session as well for your own reference.

First Session: Thursday, December 5, 2013, 9 AM - 12:30 PM

Location: TMEC Building, Walter Amphitheater

Second Session: Thursday, December 12, 2013, 1 - 3:30 PM

Location: TMEC Building, Room 447