Division of Medical Sciences
Ph.D. Programs at Harvard Medical School

Nanocourses
Spring Semester
2012 - 2013

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:

RNAi Screening: From Design to Data Analysis

Nanocourse Director(s): Norbert Perrimon
Curriculum Fellow:Leah S. Brault
Lecturers: Stephen Elledge, Stephanie Mohr, Caroline Shamu, Jen Smith

Tissue culture cells have provided a powerful system for studying many fundamental problems in signal transduction, cell differentiation and physiology. However, functional studies in cultured cells were hampered in the past by the lack of a powerful method for perturbing gene activities. A turning point came with the discovery of RNA interference and its rapid rise from small scale to genome-scale screening. Today, the most commonly used approaches are based on long dsRNA for Drosophila cells, and either synthetic siRNAs or vector-expressed short hairpin RNAs (shRNAs) for mammalian cells. Driven by genome-sequence data, RNAi is now widely used in high-throughput (HT) screens in both basic and applied biology. It is a powerful method for addressing many cell biological questions, and its amenability for use in modifier screens in addition to direct loss of function screening has made it particularly useful for the analysis of signal transductions pathways. RNAi has also become a method of choice for key steps in the development of therapeutic agents, from target discovery and validation to the analysis of the mechanisms of action of small molecules. This nanocourse will focus on both the technology and applications of RNAi screens.

DROP DEADLINE: Wednesday, March 6, 2013

Schedule:

First Session: Wednesday, March 13, 2013, 12 - 3:30 PM
Location: TMEC Building, Room 250

Second Session: Tuesday, November 27, 2012, 12 - 2:30 PM
Location: TMEC Building, Room 447

Intellectual Unit:

Science Presentation as a Performing Art

Nanocourse Director(s): David Van Vactor
Curriculum Fellow:Leah S. Brault
Lecturers: Leah Brault, Narveen Jandu

Effective communication of scientific knowledge is an essential component of any career in the sciences. The “Science Presentation as a Performing Art” nanocourse is designed to meet a critical and unfulfilled need for oral science communication training. This is a three-day nanocourse designed to help students build their presentation skills.

The first day of the course is a 2.5-hour introductory workshop that is open to the Harvard community. The first talk will focus on the “art” of presentation, and show you some exercises to help you become a better speaker! Dr. Brault will cover techniques that can be easily and effectively implemented to improve the quality and effectiveness of science presentations, ranging from body language, gesture, and movement, to vocal clarity, operative words, and the use of metaphor, analogy, and storytelling. The second talk will focus on communicating your science effectively. Dr. Jandu will go over how to outline your science presentations, mechanisms to retain audience attention and effective ways to display your data. For the third talk, Dr. Van Vactor will contribute his scientific and teaching expertise to further inform the discussion of effective science presentation with a focus on scientific content. He will give a short presentation on a research question, which will be evaluated by the audience. Dr. Van Vactor will give his presentation a second time, incorporating the techniques that had been presented and the feedback he received.

The second day of this nanocourse is a 2-hour session where groups of five or six students each will be given the opportunity to give brief scientific presentations and receive specific, critical feedback from their peers and the group facilitator to improve their presentation skills. In addition, all students will act as audience in the second session, learning from the techniques presentenced on the first day.

The third day of this nanocourse gives students the opportunity to present a revised version of their presentation from the second day. This will give students a chance to incorporate the feedback they received from their peers. In addition, they will benefit by giving a new and improved presentation.

Overall, students will learn how to improve their own specific speaking skills and how to promote and develop speaking skills amongst their colleagues so that they can apply their learning to train other classmates, colleagues, and members of student organizations outside of the scope of the nanocourse.

Schedule:

First Session: Wednesday, May 8, 2013 12:30 - 3 PM
Location: Armenise Bldg, (D) Amphitheater

Schedule of Speakers (Day 1):

Part 1-Mastering your nerves and developing your speaking skills (40-min)
By: Leah Brault
Part 2-Practical tips for presenting your science effectively (40-min)
By: Narveen Jandu
Part 3- Scientific Presentation Demonstration (20-min)
By: Davie Van Vactor

Guidelines for Day 2 and Day 3: (Please visit the Nanocourse website at https://nanosandothercourses.hms.harvard.edu/node/227 for specific dates and times of the second and third days)

Each second session of this nanocourse can accommodate up to 6 students. For the second session, please be prepared to give a five-minute scientific presentation in PowerPoint. As you prepare your presentation, we encourage you to consider the spectrum of audiences to whom and contexts within which you could be speaking. Examples include: departmental seminar to expert/peer scientists; job seminar to scientists not in your field; lay audiences who are interested in science; interested students who are not very knowledgeable about science. In giving your presentation, please be sure to mention which audience you chose. Faculty leaders and other audience members will provide feedback on both content and delivery to enhance your presentation skills, and then you will have a second five-minute period to incorporate some of the suggestions into a repeat performance. An audio recording of each speaker's presentation will be provided to that presenter.

Following the second session in which you will present, you will have 1-week to re-design your presentation. In order to receive credit for this nanocourse, you must attend the second session, perform both presentations, AND resubmit your PowerPoint presentation.

DROP DEADLINE: Wednesday, May 1, 2013

Intellectual Unit:

Cancer Genomics - Principles and Applications

Nanocourse Director(s): Rameen Beroukhim
Curriculum Fellow:Narveen Jandu
Lecturers: Gaddy Getz, John Quackenbush, Levi Garraway

Cancer genomics is a rapidly growing field that applies genome-scale technologies to develop comprehensive descriptions of cancer cells. A particular focus is the identification of genetic alterations that drive tumor growth and transcriptional, proteomic, and phenotypic correlates. An understanding of the biological impact of these alterations can potentially lead to the development cancer therapeutics. Currently many on-line tools are available that allow us to determine the impact of these alterations on tumor growth and development. Some of these resources include: Tumorscape (Broad Institute), COSMIC (Catalogue of Somatic Mutations in Cancer, Sanger), Cancer Gene Census (Sanger), Gene Expression Omnibus (NCBI), Oncomine (NCBI), and Gene Pattern (Broad). This nanocourse is designed to provide an introduction and an overview of the current on-line resources that are available on Cancer Genomics. The second session of this nanocourse will provide a hands-on approach to implementing these on-line resources in your research.

First Session: Wednesday, April 3, 2013, 2 - 6 PM
Location: TMEC Building, Room 209

Second Session: Thursday, April 18, 2013, 2:30 - 6:30 PM
Location: Countway Library Computer Lab

Intellectual Unit:

Statistics for Terrified Biologists

Nanocourse Director(s): David Van Vactor
Curriculum Fellow:Abha Ahuja
Lecturers:

Biological research is becoming increasingly quantitative. Several user-friendly statistical software packages have made it easy to apply advanced analytic methods. However, in order to fully harness the power of these methods, a basic understanding of statistics is needed. This nanocourse is designed to teach the foundations of parametric and non-parametric statistics to students with little or no background in the subject. Our main goal is not to teach the use of a specific package or advanced methods, but to understand the basic concepts. This course will help students to:

- Plan and design their experiments
- Decide which statistical test to conduct
- Interpret and understand the output from any statistical software, or primary literature
- Communicate their results accurately and effectively
- Prepare for more advanced statistics courses

Format:
This course will be very interactive. The lecturer will introduce each module with the aid of an example or data relevant to biological research. Students will explore each topic by performing simple data exercises. At the end of each module students will discuss a thought question in pairs or small groups.

Module 1: Describing your data

- Summarizing: Central tendency and Variation (Mean and Standard Deviation, Median and Interquartile range)
- Visualizing: Bar graphs, scatter plots, box plot, histograms etc.
- Is my data “normal”?

Module 2: Making decisions about your data

- Estimating uncertainties associated with your data: Standard Error and Confidence Intervals
- What is a p-value anyway?
- Null hypothesis and Test Statistics
- Hypothesis testing in action: A t – test using your calculator

Module 3: Which test should I use?

- An introduction to ANOVA, Regression & Correlation, Chi –square, non-parametric methods

Module 4: Designing your experiments

- Biological vs. technical replicates
- Sample sizes, sensitivity and power analysis
- Common statistical errors

Assignment: In order to get credit students will need to complete two take home assignments, one at the end of each day. They can do these assignments using a calculator, excel or their favorite statistical software.

First Session: Thursday, May 16, 2013, 9 AM - 12 PM
Location: Countway Library, Room 403

Second Session: Thursday, May 23, 2013, 9 AM - 12 PM
Location: Countway Library, Room 403

Intellectual Unit:
An Overview of Mass-Spectrometry-based Proteomics

Nanocourse Director(s): Steven Gygi, Jarrod Marto
Curriculum Fellow:Jason Heustis
Lecturers: , Mathew Sowa

Mass spectrometry is the enabling tool in the field of proteomics. The field has advanced at such a pace that many papers now report the simultaneous identification of thousands of proteins directly from cells or tissues. We will discuss three areas where mass spectrometry can directly impact cell biology research. 1) Practical aspects of protein sequencing via mass spectrometry. 2) Determining protein-protein interactions by affinity purification coupled to mass spectrometry. 3) The use of stable isotopes to encode whole proteomes for protein profiling of different cell states.

DROP DEADLINE: Monday, April 1, 2013

First Session: Monday, April 8, 2013, 1 - 4:30 PM
Location: Armenise Amphitheater

Second Session: Monday, April 15, 2013, 1 - 3:30 PM
Location: TBD