MITOPENCOURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

December 2013 Newsletter

Current Events in Context

Although mayonnaise is similar to mucus in thickness and opacity in a normal pregnancy, an egg white offers a better example of mucus' filament forming abilities. Image from Chemistry in Action.

Mucus is a very important slime in our body that can protect us from harmful bacteria and viruses but it may also prevent the passage of medicine through its protective barrier. What is largely unknown are the mechanics that control transport though the mucus barrier.

An MIT researcher, Leon Li, has created a microfluidic device able to measure real-time transport gradients inside the gel-forming glycoprotein component of mucus. His work may make drug delivery more successful in passing through mucus.

The following courses and resources offer an interdisciplinary approach and some insight into this type of biological engineering.

- The immunology audio lecture of 7.013 Introductory Biology examines how the body fights infections and diseases with some attention to the role of mucus.

- HST.035 Principle and Practice of Human Pathology provides a comprehensive overview of human pathology with emphasis on mechanisms of disease and modern diagnostic technologies.

Dear Friend of OCW,

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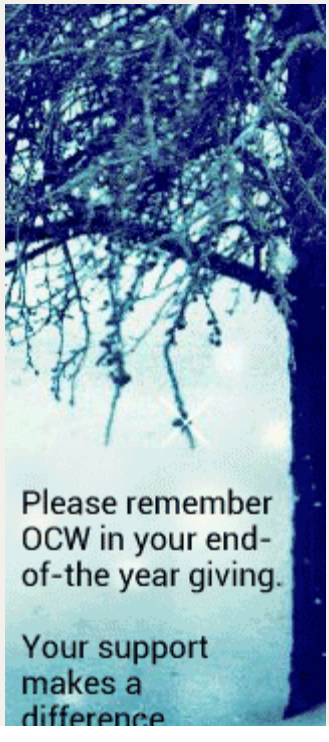

- The third lecture in HST.176 Cellular and Molecular Immunology details the immunological response to pathogens.

- In 20.201 Mechanisms of Drug Actions, the chemical and biological analysis of the metabolism and distribution of drugs, toxins and chemicals in animals and humans, and the mechanism by which they cause therapeutic and toxic responses are studied.

- In this video, Dr. Ribbeck explains her lab's focus on the basic mechanisms by which mucus prevents or allows the passage of different molecules and pathogens..

New Courses

- 2.682 Acoustical Oceanography
- 6.170 Software Studio
- 7.342 Cell-material Crosstalk: Engineering Cell-Instructive Biomaterials
- 16.63J System Safety
- 21A.550J DV Lab: Documenting Science Through Video and New Media

Updated Courses

- 17.20 Introduction to American Politics
- 24.118 Paradox & Infinity

> Find courses that interest you
> Subscribe to the RSS

Highlights for High School

Winter break is fast approaching, and Highlights for High School has just the thing to keep you entertained with two fun video series about chemistry.

If you haven't watched our reality show ChemLab Boot Camp, we highly recommend this web series about MIT freshmen navigating work in a lab for the first time. View the trailer, and then binge-watch the rest of the series.

OCW is grateful for the support of:

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You might also like Chemistry Behind the Magic, fun chemistry demonstrations, such as the combustion of a gummy bear and how to turn an ordinary beaker into a mirror.

Watch the demonstrations and be amazed! Enjoy!

> Visit Highlights for High School

MITx News: MITx announces Spring 2014 courses

MITx has announced its spring lineup of courses, which includes:

- 6.041x Introduction to Probability - The Science of Uncertainty, a classic MIT probability course that has been taught and refined at the Institute for more than 50 years, now reimagined for the edX platform.
- 12.340x Global Warming Science, which features a set of atmospheric simulators that allow students to model important elements of climate change.
- 15.390x Entrepreneurship 101: Who is your customer?, which includes case studies of MIT entrepreneurs working in areas as diverse as mobile applications, 3D printing, power electronics, international development, and watchmaking.
- 16.110x Flight Vehicle Aerodynamics, which presents the concepts, theories, models, and methods used in the aerodynamic analysis and design of modern aircraft.
- 21W.789x Building Mobile Experiences, a course taught by a Yahoo! research scientist that takes students from conception to finished product in designing an app suitable for sale through commercial app stores.
- *6.00.2x Introduction to Computational Thinking and Data Science**, which covers plotting, stochastic programs, probability and statistics, random walks, Monte Carlo simulations, modeling data, optimization problems, dynamic programming and machine learning.
- *6.SFMx Street-Fighting Math**, which teaches six reasoning tools to help you calculate mentally, simplify integrals, estimate drag forces by dropping coffee filters, and sum infinite series where every term is unknown

*15.071x The Analytics Edge**, which focuses on real world examples and case studies of how analytics have been used to transform a business or industry—including Moneyball, eHarmony, the 2012 Presidential Election, the Framingham Heart Study, Twitter, IBM Watson, and American Airlines.

The new MITx courses will be joined by reprised versions of previously offered courses including 14.73x The Challenges of Global Poverty, 6.002x Circuits and Electronics, and 6.00.1x Introduction to Computer Science and Programming Using Python.

Several spring courses, including 16.110x, 15.390x, 6.00.1x and 6.00.2x, will offer ID verified certificates for a modest fee using edX's new system for providing additional student identity confirmation. All courses may also be taken free of charge. Three of the spring MITx courses are components of recently announced XSeries programs, which provide recognition for the completion of a series of related MITx courses.

**Note that the courses not linked above will open for registration early in the new year.*

Views from Supporters

"I am a self-learner and I have been following for so long many of your video lectures on the Internet.

First of all, I'd like to thank you people of MIT and, in general, all the people who make MIT open courseware possible. You are giving a lot of people all around the world the wonderful opportunity to access such magnificient resources.

I think this is good for our future and consecuently and most importantly, you are making it a better world.

I donate to OCW because I think education is, if not the most, one the most valuable aspect (maybe that's not the word) in every country, and therefore it should be available to people who really want to learn, but can not afford it as they don't have enough money.

So, thank you for everything and keep up the good work!"

- Alfonso, Independent Learner, Spain

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Tell us what you think of OCW here.